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CONTAINING

EVANSON AND MAUNSELL ON THE MANAGEMENT AND DISEASES OF CHILDREN.

VOL. XVIII.

BOSTON:
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1848.

A

PRACTICAL TREATISE

ON THE

MANAGEMENT AND DISEASES

OF

CHILDREN.

BY

R. T. EVANSON, M.D. AND H. MAUNSELL, M.D.

FELLOWS OF THE ROYAL COLLEGE OF SURGEONS IN IRELAND,
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THE Publishers avail themselves of this opportunity to offer their most grateful thanks to the Medical Profession and the Public, for the encouraging reception hitherto given to this work. The present Volume has been carefully revised, with the view of rendering it worthy of a continuance of the professional patronage liberally bestowed upon former editions; and a preliminary chapter has been added, which, it is hoped, will be found serviceable to non-medical readers.

Since the publication of the Fourth Edition, the 'Treatise' has been, for the second time, re-published in America; so that, including the German translation, the present is the eighth impression which has found its way into the market: with a respectful hope that it may not be less fortunate than its predecessors, it is now submitted to the judgment of the Public.

41, GRAFTON-STREET, SEPTEMBER, 1847.

CONTENTS.

CHAPTER I.

PAGE

PRELIMINARY—For the use of Non-Medical Readers, . 13

H. Maunsell.

CHAPTER II.

PECULIARITIES OF THE INFANT STRUCTURE AND CONSTITUTION.

Sect. 1. General Considerations, ... 25
2. Digestive Organs, ... 27
3. Organs of Respiration, ... 30
4. Organs of Circulation, ... 31
5. Cerebro-spinal (Nervous) System, . . . 32
6. Locomotive Apparatus, ... 36
7. Growth, ... 37

R. T. Evanson.

CHAPTER III.

MANAGEMENT AND PHYSICAL EDUCATION OF CHILDREN.

Sect. 1. Management immediately after Birth—Washing and Dressing, 46
2. Food and Medicine do. do. 50
3. Food in the First Period, ... 51
4. Choice of a Nurse, ... 55
5. Artificial Feeding, ... 56
6. Weaning, ... 58
7. Food in Second Period, ... 59
8. Cleanliness, ... 62
9. Clothing, ... 64
10. Sleep, ... 66
11. Exercise, ... 69
12. Medicine, ... 72
13. Light, ... 74
14. Air, ... 75
15. Heat, ... 75

H. Maunsell.

CHAPTER IV.

MENTAL AND MORAL EDUCATION.

Sect. 1. Mental Education, ... 76
2. Moral do. 81

H. Maunsell.

CHAPTER V.

PECULIARITIES OF DISEASE.

PAGE
SECT. 1. Etiology, (Causation of Disease) 85
2. Diagnosis, (Discrimination of Disease) 99
3. Prognosis, (Foreshowing of the Event) 105
R. T. EVANSON.

CHAPTER VI.

INFANTILE THERAPEUTICS.

SECT. 1. General Observations, ... 108
2. Mercury, ... 114
3. Sedatives, ... 117
4. Alkalies and Alkaline Earths, ... 121
5. Carminatives, ... 122
6. Stimulants, ... 124
7. Tonics, ... 125
8. Antiphlogistic Plan, ... 132
9. Blood-letting, ... 133
10. Blisters, ... 137
11. Emetics, ... 141
12. Expectorants, ... 144
13. Diaphoretics, ... 149
14. Refrigerants, ... 149
15. Baths, ... 152
16. Purgatives, ... 155
R. T. EVANSON.

CHAPTER VII.

ACCIDENTS AND DISEASES OCCURRING AT BIRTH, OR SHORTLY AFTERWARDS.

SECT. 1. Still-born Children, ... 168
2. Imperforate Anus, ... 172
3. Imperforate Vagina, ... 173
4. Imperforate Penis, ... 173
5. Spina Bifida, ... 174
6. Short Frenum Linguæ, (Tongue-tied) . . . 176
7. Hare-Lip, ... 176
8. Deformed Feet, ... 177
9. Nævi Materni, (Mother-marks) 179
10. Ruptures, ... 181
11. Injuries received during Birth, ... 184
12. Blue Disease, ... 185
13. Trismus Nascentium, (Nine day fits) . . . 186
14. Infantile Erysipelas, ... 188
15. Abscesses, ... 190
16. Induration of Cellular Tissue, (Skin-bound) . . 190
17. Jaundice, (Yellow Gum) 192
18. Purulent Ophthalmia, ... 193
19. Red Gum, ... 197
20. Swelling of the Breasts, ... 197
H. MAUNSELL.

CHAPTER VIII.

PAGE
DENTITION, ... 198
R. T. EVANSON.

CHAPTER IX.

DISEASES OF THE DIGESTIVE ORGANS.

SECT. 1. General Observations, ... 209
2. Affections of the Mouth, Pharynx, &c. 211
a. Inflammation, ... 211
b. Ulceration, ... 211
c. Aphthæ, ... 212
d. Muguet, ... 216
e. Diphtherite, ... 217
f. Gangrene, ... 224
g. Cancrum Oris, ... 226
h. Mumps, ... 227
3. Affections of the Stomach and Bowels, ... 228
a. Indigestion, ... 230
b. Cholera, ... 238
c. Diarrhœa, ... 242
d. Inflammations, ... 254
4. Mesenteric Disease, ... 265
5. Worms, ... 275
6. Remittent Fever, ... 282
R. T. EVANSON.

CHAPTER X.

DISEASES OF THE RESPIRATORY ORGANS.

SECT. 1. Catarrh, ... 290
2. Bronchitis, ... 292
3. Pneumonia, ... 295
4. Pleuritis—Pericarditis, ... 297
5. Croup, ... 297
6. Laryngitis, ... 304
7. Foreign Bodies in Larynx, ... 306
8. Spasm of the Glottis, ... 308
9. Hooping Cough, ... 312
H. MAUNSELL.

CHAPTER XI.

DISEASES OF THE CEREBRAL SYSTEM.

SECT. 1. Functional Diseases, ... 319
2. Inflammatory Affections, ... 326
R. T. EVANSON.

CHAPTER XII.

ERUPTIVE FEVERS.

SECT. 1. Measles, ... 340
2. Scarlet Fever, ... 346
3. Small Pox, ... 358
4. Chicken Pox, ... 366
H. MAUNSELL.

CHAPTER XIII.

PAGE
VACCINATION, ... 368
H. MAUNSELL.

CHAPTER XIV.

CONSTITUTIONAL DISEASES.

SECT. 1. Scrofula, ... 392
2. Rickets, ... 404
3. Syphilis, ... 407
4. Purpura, ... 411
5. Pemphigus, (Burnt Holes) 413
H. MAUNSELL.

CHAPTER XV.

DISEASES OF THE SKIN.

SECT. 1. Erythema, (Scalding) 417
2. Urticaria, (Nettle Rash) 418
3. Scabies, (Itch) 418
4. Crusta Lactea, ... 419
5. Herpes, (Ringworm) 420
6. Tinea Capitis, (Scald Head) 421
H. MAUNSELL.

PRACTICAL TREATISE,

&c. &c.

CHAPTER I.

PRELIMINARY—FOR THE USE OF NON-MEDICAL READERS.

The many difficulties that lie in the way of the production of a treatise upon any branch of knowledge, that will be at once intelligible to the unlearned and profitable to those professionally acquainted with the particular subject treated of, must be obvious to every person who reflects upon the matter. These difficulties did not fail to engage our attention when we first undertook the task of writing a treatise on the management and diseases of children, and the result of an anxious and careful consideration of them, was a limitation of our original design to the composition of a work expressly adapted for the use of members of the Medical Profession. To this design we have hitherto adhered, and acted in conformity with it in the successive revisions of the four editions of our book, that have been required during the last ten years. It has been our aim throughout, not merely to guide the ignorant by laying down practical rules accredited by our own knowledge and experience, but to enable the professionally learned to follow the course of our reasoning, and to judge critically of the value of our arguments. With this object in view, we have, under the various heads of our subject, entered upon examinations of the value of lines of practice and into discussions of the merits of theories, both new and old, that can have little interest for non-professional readers, and require for their comprehension, a certain amount of elementary medical knowledge.

In the present edition it is our intention to follow the same course, and by noticing novel propositions, whether of a theoretical or practical kind, to keep our readers abreast of the knowledge of the day, and, as far as our abilities will permit, to render our work in the estimation of our professional brethren, and for their use, a complete treatise on the subject with which it professes to deal.

Such was and such continues to be the plan of our work; nevertheless the course of circumstances now induces us to make a small addition to the structure, which, while it will extend its utility, will not, we trust, be considered as a violation of the symmetry of the original design. Somewhat contrary to our expectations, our treatise has fallen into hands for which, as we have said, we did not intend it; and the extensive sale which it has met with among the non-professional public, now warns us to take the opportunity of the publication of a new edition, to do what in us lies, to fit it for the better fulfilment of its unexpected destiny. It is with this design that we write the present chapter, which we intend for the use of non-professional readers; to help them through some of the verbal difficulties they must find in the work; to guide them in pursuit of the knowledge useful to them which is contained in it; and to warn them from that fatal error, over-confidence in written precepts, into which an unskilful study of medical books too frequently leads the unwary.

The subjects treated of in the ensuing chapters, naturally divide themselves under two heads, viz.:—1. Those which relate to the management of children, in order to the preservation of their health, and the removal or prevention of any cause that might obstruct their moral and physical development; and 2. Those which relate to the detection, discrimination, and treatment of diseases to which the constitution of the child is liable.

Under the first head we may class the second, third, fourth, eighth, and thirteenth chapters, upon the study of which, by non-professional readers, we will now offer a few remarks. In the original composition of these portions of the book, and yet more especially in revising them for the present edition, we have endeavored as much as possible to write in plain English, and to avoid the use of technical phrases, whenever the idea could be conveyed in expressions more generally intelligible. In the second chapter, upon the peculiarities of the infant structure and constitution, this process of translation into the vulgar tongue, of an epitome so concise as that which our limits permitted us to make, was necessarily attended with very considerable difficulties. It was impossible to deal with the subject at all, without presupposing the reader to be possessed of a very considerahle amount of general elementary knowledge of the structure and functions of the human body, and notwithstanding our utmost efforts to construct a plain tale, we cannot hope that it will be generally intelligible to persons untinctured with medical learning. The object of the chapter is to furnish a brief summary of the principles, from which a knowledge of the proper mode of managing children in health and disease should be deduced; but as a full exposition of those principles would be, in fact, a treatise upon the elements of general medical science, we have been forced to confine ourselves to a sketch of such differences in the form, structure, situation, and mode of action of the several organs and systems, as mark any important distinction between the constitution of the child and that of the adult. To enable a reader to comprehend thoroughly the extent and effect of such variations in structure and function, it would, of course, be necessary that he should possess a considerable knowledge of the anatomy and physiology of the human body. Many of our premises must, therefore, be taken upon trust by the general reader; yet we think a careful perusal of the chapter may have the effect of fixing in the mind the value of the practical precepts subsequently laid down, as being deductions from an elementary knowledge of causes, as well as the result of experience and observation.

Let us take an example or two in illustration of our meaning. In the third chapter we have prescribed certain practical rules for the feeding of children, derived from a lengthened experience and continued attention to the subject, and although we have there admitted that "no theory should be allowed the slightest weight, in a particular instance, in which it may be contradicted by experience," still the general precepts inculcated, will be found to have a sure theoretical basis, if we compare them with the elementary facts, as to the structure and mode of action of the digestive organs, taught in the previous chapter. Thus, we have discountenanced the spoon-feeding of children, because that system has not generally succeeded in practice, but if necessity requires a child to be artificially fed, we have recommended food of an unirritating quality to be given by means of a sucking bottle: these are practical rules, but if the reader turns to the second section of the second chapter, he will find sound theoretical reasons for them in the differences there pointed out between the digestive organs of the infant and the adult. It is true he may not be able to appreciate the exact amount and nature of the anatomical peculiarities there referred to; but he will find no difficulty in understanding the broad statements; that nature has made a peculiar provision for the performance of the act of sucking, by the shape she has given to the palate, nose and lips of the child; that the size and activity of the salivary glands is comparatively greater than at a more advanced age, and that the act of sucking, inasmuch as it causes an increased flow of saliva, by the pressure it occasions on those glands, performs an office additional to that for which it is primarily designed, and which is no doubt important to the health of the child. These facts must be taken upon our word by many readers; but their nature can be easily understood, and they show that our practical objections to spoon-feeding, and our practical recommendation of a means of obviating some of its disadvantages by the employment of the sucking bottle, are based upon a true theory. The rule for using food of a simple, unirritating, and easily assimilated quality will be acknowledged to be equally well founded, when it is known that the lining membrane of the child's stomach and bowels is not only peculiarly sensitive, irritable, and soft in texture, but deficient in an apparatus (the *valvulæ conniventes*) that exists in the adult, and the use of which is, to delay the passage of food of a less digestible quality, in order to afford time for the absorption of its nutritive particles.

In like manner the practical advice offered in the fourth chapter, upon the subject of mental and moral education, will derive some additional weight from such knowledge of the condition of the brain and nervous system, in infancy, as is communicated in the fifth section of the second chapter. The anatomy of the brain, it is true, cannot be learned by a perusal of the few pages contained in that section; but our practical interdiction of all attempts at forcing the intellectual growth of the child can scarcely fail of being better appreciated, when it is known that the brain, in early youth, is peculiarly soft in its texture, and so imperfect in development, that its parts are not all fully formed until about the seventh year. Again, when an unlearned reader has been shown, that physical sensibility and susceptibility to impressions peculiarly characterize infancy, and exist in connection with a large endowment of nervous matter remarkably soft in texture, he will probably perceive more force and importance in our maxim, that early education, whether intellectual or moral, should be directed far less to the communication of knowledge, than to the training of the faculties into proper habits of action.

These examples, we trust, will be found sufficient to explain the uses that our second chapter may be made to serve to a non-professional reader. The statements contained in it must be taken upon our credit, and considered as so many axioms upon which the propositions in the more practical portions of the book depend: a perusal of them may gratify a laudable curiosity, and will serve to bring an unlearned inquirer one step nearer to the knowledge of he causes of health and disease. To such an inquirer, however, our advice is, to cultivate an acquaintance with the practical precepts, inculcated in the third and fourth chapters, in the first instance, and subsequently to seek a confirmation of the soundness of those precepts, by learning the principles upon which they are based; which can be accomplished, to an extent sufficient for the general reader, by a careful perusal of the second chapter. Upon the study of the third and fourth chapters, themselves, we have little to say, beyond recommending that they shall be attentively read throughout. In their composition, we have exerted ourselves to the utmost, to avoid technical expressions, and when these were unavoidable, we have endeavored to explain them in familiar terms. We have endeavored to be as brief as might be consistent with the avoidance of being obscure, and, we are not conscious that any point of importance in the management of children, (considering that subject within the limits assigned to us, by the nature of our work,) has been omitted.

In the eighth chapter we have treated the subject of teething, explaining the mode in which it is accomplished as a natural process, the symptoms which usually accompany it, and those ailments of a more formidable kind, that may not unfrequently be traced distinctly to this source. From a study of this portion of our work, a non-professional reader may, we hope, acquire useful information with respect to the natural course of a most important operation in the economy of the child, and, at the same time, learn to discriminate the more obvious signs of diseased actions that sometimes attend it. What we are most anxious to impress, with respect to these complications, is the danger of overlooking formidable and insidious diseases that may happen to occur about the period of teething. This error is not unfrequently fallen into, even by experienced parents; and we know that we cannot too strongly inculcate the necessity of obtaining medical advice, not only upon the appearance of any of those more alarming symptoms which we have described, but whenever the derangements of health that ordinarily accompany teething seem to produce any marked effect upon the appearance and condition of the child. There are few problems in medicine more difficult of solution than the determination, in some cases, of the exact relation between teething and co-existing disease; and, we trust, the mode in which we have discussed the subject may lead the general reader to a better understanding of this fact, rather than to any undue confidence in his own imperfect knowledge.

The account we have given of vaccination, in the thirteenth chapter, requires no introductory remark. The subject is essentially popular in its nature, and some acquaintance with its history and practical details has, happily, become necessary to every educated person.

So much for that division of our subject which includes a consideration of the management of children, in order to the preservation of their health, and the removal or prevention of causes capable of obstructing their moral and physical development. Let us now consider how a non-medical reader may safely and usefully turn to those portions of the book which relate to the detection, discrimination, and treatment, of disease. Under this head, the first dogma we propose to lay down is, that it is utterly impossible to learn the practice of medicine, in any of its departments, from books. This is a proposition equally applicable to every practical art; and having, once for all, stated our belief in its truth, we discharge our consciences from the guilt of encouraging any attempts at acting in contravention of it. No one is countenanced by us in imagining that, without long and wearisome study by the bed-side of the sick, he can conscientiously presume upon knowledge obtained from our pages to treat a case of water on the brain, or remittent fever, of measles, or hooping-cough, even though he may have succeeded in correctly determining the name of the disease. No enemy to society is more dangerous than a bad physician. In the same category with bad physicians we must include all those who presume to cope with disease, relying upon such knowledge alone as they can derive from books.

Nevertheless, an acquaintance with the signs and general nature of human maladies, of such a quality as will lead to caution, rather than to presumption, is in a high degree useful; and, as respects the ailments of children, is, in many situations of life, indispensably necessary to the comfort of parents. We venture to hope that our observations on the diseases of children may aid those who desire to engage in the pursuit of this description of knowledge. They may, at least, be perused with safety, if the caution we have above given be constantly held in view.

The first point of difficulty that occurs to the mind of a parent, whose attention is called to the illness of a child, is the name of the disease; and the common course adopted upon such occasions, when medical advice is not at hand, is to give it some appellation, and then proceed to treat the patient, either under the guidance of traditionary rules, or in accordance with the precepts of some writer upon the subject. This is the usual plan of proceeding, and it is one that almost certainly leads to error. It is a mere chance that the ailment will be rightly named; and, if it should be, it is equally uncertain that the plan of treatment will be chosen correctly, with reference to the stage of the disease, the state of the patient's system, the season of the year, or the hour of the day. A familiar example or two will explain our meaning. A child may be suddenly seized with a convulsive fit, and the disease having thus, as it were, named itself, a line of treatment recommended by tradition, or by some writer on convulsions, will be forthwith adopted. Convulsions, however, (even interpreting the term in its most popular sense,) may arise from a variety of causes, and differ diametrically in their nature: they may depend upon over-fulness of the system, or upon weakness: they may be occasioned by irritation in the bowels, or by teething; or may be the first marked symptom of water on the brain, or of small-pox. Amidst these perplexities, it is obvious, that the name of a symptom only, and not of the disease, is known; and as the symptom, by itself, belongs equally to very opposite states of the system, and may precede very different maladies, an acquaintance with its name brings no real knowledge whatsoever. In another case say, of hooping-cough, it is highly probable that the real nature of the ailment will be recognized, and that it will be correctly named. Nevertheless, if the traditionary mode of treatment by change of air and stimulants, be employed indiscriminately in every case of hooping-cough, without having regard to the stage of the disease, (whether it be at its commencement or decline,) to the state of the patient's system, (whether inflammatory or nervous,) and to the season of the year, (whether inclement or mild, damp or dry,) fatal errors will, in many instances, be committed.

An unlearned reader, then, must not attempt to use a treatise on the diseases of children as men use a dictionary, or hope to be guided to an attainment of exact and serviceable knowledge by the names in its table of contents: he must rather consider it as a philosophical grammar, from which he may learn general principles, and rules for the avoidance of error. It is an acquaintance with the signs of diseases generally, rather than with their names, such a reader should aim at attaining. He should endeavor to learn the indications of the seat of maladies; as, whether they are seated in the head, the chest, or the belly; the marks of imminent danger; the characteristics that denote whether the complaint will terminate favorably or unfavorably; whether it will be rapid or tedious in its duration; and whether active treatment will be required and can be borne, or must be avoided, as mischievous or unnecessary. All these matters are discussed in a general way, under the heads Etiology, (or causation of disease,) Diagnosis, (or discrimination of disease,) and Prognosis, (or foreshowing of the event,) into which our fifth chapter is divided; and to this chapter, but more especially to its second section on Diagnosis, we would desire to direct the particular attention of non-medical readers. We are not aware that we can render the information there communicated into plainer or more intelligible language; but the subject may, perhaps, be familiarized to some minds by individualizing it in a particular illustration.

Let us suppose, then, that a child is observed to be peevish and restless, yet unwilling to be stirred or handled; that it does not sleep at the ordinary hours, nor so calmly as usual; that its skin is hot and dry, its flesh soft; that it is thirsty, and that the discharges from its bowels are irregular, and unnatural in appearance. These are general signs that a child is unwell, so plain and obvious in their character, that no parent or nurse will fail to recognize them. But the fact of the existence of illness being thus forced upon our attention, it becomes necessary to inquire into the seat of the disease, and we must proceed to make more particular observations. We look attentively upon the child's countenance, and it may be that we observe the brows to be knit and contracted, the eyes fixed and staring, or looking wild and unusually brilliant: this induces us to place our hands upon the head, which we find to be hot; the open of the head, as it were, distended, and throbs violently; the veins about the temples and forehead are swollen and visible. The child may, perhaps, roll its head from side to side upon the pillow, or the head may hang heavily and loosely, as if powerless; or the neck may be stiff, and drawn backwards. These signs indicate plainly that mischief is going on within the head, and further observation will, probably, detect additional marks indicative of the nature of the disease, and of the amount of danger. We may find that the hands are hot, and the thumbs turned fixedly into the palms; that the great toes are rigidly bent; the pupils of the eye may be contracted to a small point, or very much dilated, and apparently insensible to light; there may be squinting; convulsions may also occur; or one side of the body may be occasionally convulsed, and the other remain constantly paralysed and motionless. The degree of danger may be roughly estimated, according as more or fewer of these symptoms are present, or as they are observed to be more or less strongly marked; but it should never be forgotten that considerable danger is indicated by the appearance of any sign of disease of the head in the child, and that the danger is of a kind that will not bear tampering with. In all such cases, therefore, no time should be lost in procuring proper medical advice; a recommendation which we feel convinced will be strengthened should the reader's curiosity lead to a perusal of our chapter on diseases of the cerebral system, in which the varieties, obscurity, and danger of these affections, are fully set forth.

In another case, in addition to the general marks of illness, we may easily recognize the seat of the disorder to be in the chest and breathing organs, by the presence of cough, watering of the eyes, running from the nose, wheezing, and difficulty of breathing. These signs, however, may precede or accompany diseases very different in their nature and degrees of danger. The first-mentioned three may be the marks of a common cold, or the preliminary symptoms of measles or hooping-cough; and their true character can only be determined by the lapse of time. Their danger is to be estimated by the amount of fever that attends. For further information, the sections on catarrh and bronchitis, in the tenth chapter, may be referred to. When much wheezing is present, with apparent difficulty of breathing, danger is always to be apprehended, and its amount is to be estimated by the greater or lesser degree in which the latter symptom exists. If the breathing be quick and laborious, if the face be puffed and discolored, the lips bluish, the nostrils dilated and their sides in quick motion, the eyes blood-shot and prominent, these are sufficient signs that mischief is brewing, and that skilful treatment is required. Medical aid should, therefore, be procured without delay.

Among the affections of the organs of breathing, those of the throat are particularly dangerous, from their rapidity of progress and suddenness of attack. They are also, fortunately, more easily to be recognized than most other ailments. In the child, the most formidable of these diseases is croup, and its distinguishing mark, a short, dry, ringing cough, can scarcely be mistaken. This cough commonly seizes a child suddenly in the night, and it may be the first symptom of illness, or it may be preceded for two or three days by the common signs of chest disease, which we have mentioned above. In either case, its treatment cannot be commenced too promptly; and, if medical advice be not immediately at hand, the moment its sharp, brazen cough, resembling the single bark of a small dog, is recognized, those means directed in the fifth section of the tenth chapter should be put in practice. In such cases, however, medical aid should also be obtained as speedily as possible.

There are other complaints of the throat incident to childhood, which, although not so common of occurrence as croup, are yet very dangerous, and so rapid in their course towards a fatal termination, as to render it highly important that non-medical persons should be acquainted with their signs—not, indeed, with a view to their meddling in the treatment, but that they may be aware of the necessity for an early recourse to medical assistance. These affections are treated of in the sixth, seventh, and eighth sections of the tenth chapter, where a description of their marked characters may be perused. As a general rule, however, it may be laid down, that danger is to be apprehended whenever any sudden or marked alteration is observed in the cry of a child, especially if attended with difficulty of breathing, either permanent or occurring at intervals. If the cry should be dry and husky, or hoarse, or the breathing be accompanied by a crowing sound, apprehensions of approaching mischief should always be entertained.

When the seat of disease lies in the belly, and engages the digestive organs of the child, another set of indications may be observed. The expression of the countenance is markedly different from what it is in affections either of the head or chest; but it is very indicative of inward distress. The face is pale, or sallow and swollen, the lips apart, and sometimes drawn so as to show the gums or teeth, the eyes sunk and dim, and the skin under them, it may be, dark-colored. The child seems to dread motion ; it lies upon its back, with the knees drawn up ; the belly may be full and puffed, or empty and retracted, but it is usually tender to the touch. The skin may be hot and dry, or, in the latter stages, cold and clammy. There is thirst, and a desire for cold drinks. The presence of these signs, in various degrees, sufficiently proves to an experienced eye the existence of serious disorder in the belly, and they will be found to be accompanied by vomiting, or purging, or, probably, by both these symptoms. The diseases of the digestive organs are numerous, and very various in their nature, and require considerable skill for the discrimination of their exact character, and the determination of the proper mode of treatment applicable to each : they are fully considered in the ninth chapter. They differ from diseases of the head and chest in not being generally so rapid in their course ; but their manner of attack is often so insidious as to induce parents to postpone application for medical aid until it becomes too late to prevent mischief. The truest general marks of danger we can point out are, tenderness of the belly, sudden loss of strength, and wasting of the flesh. When these signs, or any of them, accompany purging or vomiting, danger should always be apprehended, and medical advice sought for.

Among the diseases of the digestive organs are to be classed several affections of the mouth and gullet. Some of these are simple and harmless, as the *thrush*, the nature of which is explained in the second section of the ninth chapter, while others are in the highest degree dangerous in their character.

Among the latter should be classed all cases of blisters, or sores, or deposits of curdy-looking matter, in the mouth, which are accompanied by an offensive smell, or by manifest derangement of the general health. If neither of these marks accompany what nurses call *a foul mouth*, it is not likely that danger need be apprehended.

The prominent characters and marks of danger that belong to those diseases of children that cannot be classed among affections of the head, chest or belly, are detailed in the seventh, twelfth, fourteenth and fifteenth chapters, and it would not be possible to condense them into any summary that would be intelligible. We have in every instance introduced the popular names of those ailments into the index, and some of these, as for example, "hare-lip," "deformed feet," "rickets," are so familiar and definite in their signification, as to render them sufficient guides to the page or section where information respecting them is to be obtained. Others, as scrofula, measles, small-pox, are so common of occurrence or so plainly marked by visible characters, as to render their general recognition, even by non-medical readers, a matter of no great difficulty.

There are certain characteristic circumstances common to most diseases, which afford information as to their probable termination; whether it is likely to be favorable or unfavorable. These circumstances are treated of in a general way, in the first and third sections of the fifth chapter; and they are dwelt upon with more especial reference to each particular disease, under their respective heads. Among the most prominent of these characteristics, we may place the nature of the disease itself: thus, the "nine day fits," or "lock-jaw of infants," is almost necessarily fatal, while "simple thrush," or "red-gum," as certainly proceed to a favorable termination. The season modifies the terminations of complaints, both by its mildness or severity, and also by some peculiar influence upon the general type of diseases, the nature of which is unexplained, but which varies in different years. Thus, children may be expected to recover more perfectly and rapidly from attacks of measles or hooping cough, in mild summer weather, than in the damp cold months of winter and early spring: and during one year, almost every case of scarlet fever will prove fatal, while at another period, the complaint will very generally assume so mild a form, as scarcely to justify its being called a disease. The true cause of this latter variation is unknown; though, for want of a better name, it is called the "constitution of the year" by medical writers. It affects almost every disease, more or less, but its character cannot be estimated at any particular time, except from an extended observation of the prevailing epidemics. Peculiarities of local situation, have a considerable effect in modifying the character of diseases, and influencing their terminations. Thus, croup is both more common and more untractable in low, damp situations, as in towns placed near the mouths of sluggish estuary rivers: scrofula, also, is generated and aggravated by the want of light and air, that usually characterizes the poor quarters of large cities. It naturally follows that the terminations of diseases thus produced by local peculiarities, will be rendered more favorable by a change of situation, or a removal of the injurious influences. Hereditary or family predisposition affects the character and termination of many diseases, as for example, water on the brain, and croup; when any such predisposition is suspected to exist, it becomes the more necessary to watch the first approach of such complaints, and to adopt every practical means for their prevention. The age of a child is an important item to be taken into account, in forming an opinion as to the probable termination of any disease that may affect it. The natural vigor of the infant constitution is so great, and so remarkable are its powers of reparation, that hopes of recovery should, scarcely in any case, be abandoned. No matter what disease may affect a child, it never should be left to die; nor its restoration to health ever be despaired of, even in the most apparently desperate circumstances.

The rapidity or tediousness of children's diseases, depend upon many circumstances, and among the foremost, is the nature of the complaint itself. Thus inflammation of the lungs, if properly treated, runs rapidly through its course; while worm fever, is naturally a slow and tedious ailment. The constitution of the child exerts a considerable influence in this respect: a ruddy, well nourished infant, which has been freely exposed to wholesome country air, will shake off, in a few days, a complaint that would hang for weeks and months upon a pale, flabby, town-bred patient. The treatment of a disease will also naturally influence its duration: many a complaint is kept on by an injudicious continuance of the treatment, which, if stopped in proper time, would have cured it; and there is perhaps no lesson more necessary to be inculcated upon non-medical persons, than the danger of over-doctoring their children.

The subject of the uses of medical means in the treatment of the diseases of childhood, is considered at length in the sixth chapter; but this is a matter which we would advise the non-medical reader to approach with extreme caution. 'The less the taste of parents for physic, the healthier will be their children,' is a rule that scarcely admits of an exception. Medicines are edged tools, in the use of which considerable skill is required; and they are by no means fit playthings for a nursery. We trust, however, that the minuteness with which we have thought it necessary to discuss the various appliances and modes of treatment, for the information of our medical readers, will be taken as the most intelligible warning we can give to others against an unskilful tampering with such dangerous weapons.

Finally, we know no better advice wherewith we can accompany the tender of our work to the public, than that which is contained in the pithy maxim, written over the door of his consultation-room, by a physician of old—*Primum est non nocere; secundum prodesse.* Let our first consideration be, how we shall do no mischief—our second, how we shall do some good.

CHAPTER II.

PECULIARITIES OF THE INFANT STRUCTURE AND CONSTITUTION.

I.—GENERAL CONSIDERATIONS.

In considering the peculiarities of the infant structure and constitution, as well as in the observations which we propose to make upon the diseases of children, we shall regard the period of childhood as consisting of two epochs—the first commencing at birth, and continuing until the twelfth month; the second commencing at the termination of the first year, and continuing until the eighth.

This division, which has been generally adopted, possesses the merit of being nearly in accordance with one definitely marked out by nature herself. About the tenth or twelfth month, the child, by its acquisition of teeth, becomes fitted for the use of other nourishment than the mother's milk; and the stomach and bowels receive, not merely with impunity, but with advantage, kinds of food, which, during the earlier months, would have been productive of serious derangements of the digestive functions; at the same time very obvious external changes have their commencement, and indicate marked alterations, both bodily and mental.* During the first period, also, the child is subject to some peculiar diseases and dangers, to which the attention of the physician requires to be specially

* "At this time," says Wendt, "the hitherto projecting forehead becomes flattened, the countenance receives expression, the eyes intelligence, the limbs firmness."—*Die Kinderkrankheiten systematisch dargestellt von Dr. J. Wendt. Wien,* 1827.

directed, and the diminished liability to which, upon the commencement of the second epoch, together with an increasing power of resisting disease, adds materially to the probabilities of existence.

Beyond the eighth year, we would not employ the term, child—though applied by some until the age of puberty: but before then, the peculiarities characteristic of childhood have been merging into the attributes of adult age; while the influence of sex begins to be discernible, and the individual may thenceforward be designated as boy or girl.

The infant, at birth, is endowed with the same organs as the adult; but so different, for the most part, in structure, development, and even situation, as to constitute essential characters, which distinguish childhood, and without a knowledge of which, neither the management nor diseases of children can be correctly understood.

Infancy may be emphatically termed the period of growth. We find the infant, at birth, fully provided with the organs of nutritive or organic life—those which are essential for the sustenance and nutrition of the individual; while the organs of animal life or relation,—those which connect man with the external world, and make him, on their completion, the superior being that he is,—are as yet but imperfect in development or structure, and herein is to be found the basis of that great difference observable between the infant and the adult. In the former, we have the organs of nutritive life alone, fully developed, and actively employed; but in the latter, we have both classes of organs, relative as well as nutritive, brought to completion and in full activity, constituting the period of maturity or perfect growth.

To speak in general terms, we may say, that the anatomical structures in the infant differ from those in the adult, by their greater softness or want of consistency; being surcharged with fluids, and many of them as yet unfitted for the full discharge of their appropriate functions; while in advanced life, on the contrary, the quantity of fluids diminishes, and the structures become condensed, so that the organs, instead of being too soft, have become too rigid, as we find them to be in old age. In the infant, the glandular and capillary systems, predominate; absorption and deposition are active, and the processes of interstitial growth most vigorous: secretion is abundant, and excretion frequent; the nervous sensibility being acute, and the membranes remarkable for their vascularity; all which phenomena depend, not merely on the abundance of blood present, and the activity of its circulation, but on the preponderance of the arterial over the venous vessels.

Before proceeding to a particular review of the several organs, and the properties by which they are characterized in childhood, it may be well to take a glance at the general appearance of the newly born infant.

The length of the body varies from about one foot and a half to a little less than two feet. Baudelocque states sixteen inches, and twenty-two (or at most twenty-three) inches, as the extreme limits. The average weight is about six to seven pounds and a half; more has been assigned, but is not common; six pounds is by far the most common weight, according to Camus's Tables.

The skin is thin, tender, and of a reddish hue; but covered at birth with a whitish unctuous matter, called *vernix caseosa.* There is some hair upon the scalp, and the nails reach to the ends of the fingers: the articulations are commonly flexed, the limbs round, and the body plump.

The relative dimensions of various parts differ materially from those observed in after life. The lower extremities are less developed than the upper; the median point—that lying midway between the two extremes of the body—being found at the navel, or a line or two below it. The pelvis in the infant is small and contracted, being less developed in proportion than the chest, which is flattened at the sides, but prominent in front; while the abdomen and head present dimensions, not only very large in comparison with the other cavities, but also as compared with their own dimensions in after life.

The newly born infant possesses little power of motion; none of independent support. Sensation and perception are dull or absent. Its cries and movements may be looked on as involuntary—its search for food is instinctive. One third of its time is chiefly occupied in taking nourishment, the remainder is passed in sleep.

Peculiarities not less striking or important, arrest our attention, on turning to the consideration of the internal organs; and these we shall briefly notice in succession, commencing with those of organic life, as being first called into action; and of these the digestive organs naturally claim precedence, and will be found in a high state of development.

II.—DIGESTIVE ORGANS.

The mouth of the infant is fully formed, and in certain respects particularly adapted to the performance of its proper office of suction, as we see in the disposition of the palate and lips, and the obliquity of the posterior nares; yet appearing to be imperfect from the want of teeth, which, however, can hardly be said to be wanting—only absent; as they already exist within the gum, in due time to make their appearance and mark a new era, when the child becomes fitted for a different aliment, from that hitherto provided by nature for its sustenance.

The mucous membrane lining the fauces, pharynx, stomach, and the whole tract of the intestinal tube, is thick and villous; being more sensitive and vascular than in after periods of life; softer in texture, and more bedewed with mucus, which is abundant, but thin; becoming viscid, however, and much increased in quantity on the occurrence of any irritation. The sensibility of the mucous membrane is adapted to the mild and unirritating fluid provided by nature as the suitable nourishment for the infant: any other substance proves irritating in a greater or less degree, and is therefore to be avoided.

The stomach and duodenum are fully formed, their mucous membrane being thick, villous, and of a rosy tint. But the position of the stomach in the infant, differs from that in the adult, in hanging almost perpendicularly, so as to extend from the epigastric to the umbilical region: instead of being placed in the transverse position which it occupies in after life. The omentum, which is attached always to the great curvature of the stomach will, in consequence, be found in the infant, more towards the left than the right side. The small intestines in the infant are a third longer in proportion to the length of the whole intestinal tract, than in the adult; and the large intestines are longer in proportion to the small, but their calibre is relatively less. The valvulæ conniventes are scarcely apparent; the vermiform process is very long, and the cœcum is largely developed.

The salivary glands and the pancreas are very large, and seem particularly active; the whole glandular system being much larger, in proportion, in the child, and more active, so as to give to the infantile constitution a peculiar and important character.

Digestion is rapid and incessant; the child frequently requiring food, which, if permitted, will be often taken to repletion; so as to be ejected without effort from the overloaded stomach, which is not capable of containing more than a few ounces of fluid at a time.

The chyle, which is rapidly eliminated, is quickly absorbed, the tract of the small intestines being long, as we have seen; while the lacteal vessels and mesenteric glands are largely developed, and in a high state of activity.

The gall bladder, though small at birth, soon enlarges; and is found to contain bile, bitter in taste, and green in color: but bile, in the infant, is less viscid and less charged with the principles peculiar to this fluid, than at a more advanced age, when concretions are liable to form.

The liver undergoes a remarkable alteration in function and form after birth. The mode of circulation is changed; the left lobe diminishes, the umbilical vein and canalis venosus are obliterated; while the vena potæ is developed, and the secretion of bile becomes the peculiar function. The parenchyma of the liver becomes darker as life advances; and the size of the organ diminishes relatively in volume, receding towards the ribs, within which it is situated in the adult; but in the infant, it extends to the middle region of the abdomen; and instances are recorded, where the proportion of the liver remained through life as in the fœtus.

The spleen presents little peculiarity that we are as yet able to notice; too little is known of its functions to enable us to appreciate any changes that may occur; but we have observed, that it is subject to disease at a very early period. The spleen may be felt in the infant below the false ribs, chiefly in the middle region; not in the left hypochondrium, as in the adult, in whom indeed the spleen can hardly be discovered by the touch unless when in a diseased state.

The bowels, at birth, are found to contain a dark-colored, inodorous, insipid substance, which is called *meconium*, and appears to result from accumulation of intestinal secretion, for which passage had not before been provided. This is, however, soon expelled, and its place occupied by the residue of the food; which from the nature of the infant's aliment, we might conjecture, would be but little characterized by the properties of fecal matter.—Accordingly, we find the contents of the bowels in infants, much less feculent than they afterwards become; being thin, charged with mucus, and of a yellowish color; possessing little fetor, but abundant, and frequently expelled, the infant passing a stool three or four times each day.

In a similar manner, we find the excretions less odorous, more watery, and not so largely charged with their peculiar principles, saline or otherwise, as in the adult; but they are quickly discharged, though not very abundantly secreted. The perspiration is less saline and odorous, but more watery, though not copious. The urine differs in like manner from that of the adult, (in particular, the quantity of the urea is much less,) and it is retained a much shorter time, being, like the feces, often expelled. This does not depend merely on the constant supply of food, or less relative capacity of the containing viscus; but is connected with the peculiar sensibility of the lining membranes, and irritability of the muscular coats of these viscera; which like the other involuntary muscles, are more irritable in the infant, than they are subsequently found to be. In their tissue, they are softer and of a paler hue; nor has command over their actions been yet acquired.

This latter character, in particular, attaches to the urinary bladder in the child, and occasionally continues to give annoyance for some time, by leading to frequent wetting of the dress or bed clothes. The bladder, in the infant, is more elongated in shape, and situated higher up, than that of the adult; but is less capacious in proportion, while the ureters are particularly large. But it is upon its difference of anatomical structure, as regards the position of the urethra, more than perhaps other circumstances, that this difficulty of retaining the urine depends; for the pouch or fundus of the bladder *(bas fond)* does not exist in the fœtus, the cervix or urethral opening being then most dependent; and this state of parts still obtains to a certain degree in the young subject; probably in some more than others.

The kidneys undergo remarkable alterations; their lobular formation disappearing, and the supra-renal capsules rapidly diminishing; but the relation which these changes bear to the functions of the organ, is not very obvious.

III.—ORGANS OF RESPIRATION.

Having considered the digestive organs, or those which generate the materials for the blood, we shall now notice the respiratory organs, or those by which the blood is regenerated, and fitted again for the purposes of the circulation.

In no organs do more important changes occur, at birth, than in the lungs; in nothing does the infant more remarkably differ from the fœtus, than in being a respiratory animal. The lungs, which before birth had been condensed, of a brownish red hue, very vascular, and not as yet permeated by air, now suddenly augment in size, becoming, after respiration, of a rosy color, soft and vesicular in structure, and crepitant to the touch.

The respiratory process, (which, in the child, is in a great measure performed by the action of the ribs,) is carried on with rapidity and force, consonant to the general activity observable throughout the system; and in particular, the constant demand for fresh supplies of blood. The inspirations and expirations are equal and frequent;—the more frequent, the younger the child; being, during the first year, from 35 to 40 in the minute, or nearly double those of the healthy man; while the sound emitted on the passage of the air, is so peculiar from its force and sonorousness, as to obtain the distinguishing appellation of *puerile respiration*. This character, respiration in the adult occasionally assumes, when the healthy portion of a lung is obliged to take on a compensatory action, in consequence of obstruction in the diseased portion (as in Pneumonia)—when the respiration in the sound part is said to be *puerile*, as significant of its force.

Notwithstanding this activity in the process of respiration, it would appear that less oxygen is consumed in the infant than the adult, and that the power of generating heat, (a process closely related to respiration,) is also less. The medium temperature may be estimated at about 98° of Fahrenheit, according to M. Roger.

The thymus gland, which occupied a large and conspicuous space within the upper and anterior part of the thorax in the fœtus, gradually diminishes after birth, and is hardly to be recognized in the adult. It is freely supplied with veins and arteries, and contains at first a whitish fluid somewhat like chyle, which shows the gland to have a secreting power; but it is not generally acknowledged that any excretory ducts exist. Its supply of blood-vessels and softness of texture, seem to allow of sudden augmentation of size; and this, in instances where the gland is larger than ordinary after birth, may cause, by the pressure exerted on subjacent and important parts, very distressing or dangerous symptoms. To such cause has been attributed a spasmodic affection, to which some children are liable, and which often proves fatal; at least the thymus gland has been found distended or enlarged in some such instances. In common, it does not exceed a couple of inches in length, one and a half in breadth, and a quarter of an inch in thickness.

IV.—ORGANS OF CIRCULATION.

The blood, having undergone the requisite changes in the lungs, is conveyed again to the heart, thence to be sent throughout the system. From the moment the act of respiration is performed, the circulation undergoes a total change; and the heart is altered accordingly, becoming complete in its functions, but still retaining some remarkable peculiarities in the infant. Its volume is proportionably large; but the relative capacity of its cavities differs from what is afterwards observed, those of the left side—particularly the ventricle, and, in connection, the arteries—preponderating decidedly at first: the balance, however, is gradually altered, until we find, in the adult, the cavities of the right side of the heart nearly three times the size of those of the left.

The thickness of the parietes of these cavities, however, changes inversely with their capacity; for, from being nearly equal, the parietes of the left ventricle become almost four times as thick as those of the right—a change which rapidly proceeds after the obliteration of the ductus arteriosus, and the closure of the foramen ovale, when the left ventricle has the sole conduct of the circulation through the system.

The parietes of the heart are softer and paler than in after life, when the relative bulk is less, but the texture firmer, and color deeper; this organ being then called upon to propel its contents with greater force, as they have to traverse a longer space. In the infant, the large volume but feebler power of the heart fits it for the propulsion of a larger quantity of blood, but through a less distance; while the peculiar irritability of this, as well as the other hollow muscles, during infantile life, ensures more active contractility, and so, more rapid action, suited to the constant demand for fresh supply. Accordingly, we often find the pulse in the infant, like the respiration, nearly double in frequency that of the adult, varying from 120 to 140 beats in a minute.*

The part of the nervous system more immediately connected with the class of organs which we have just been considering, should naturally be in a high state of development, to allow of that fullness of function which we have seen these organs to possess: and accordingly, we find the ganglions, or system of the sympathetic nerve, very perfectly formed at birth; while the brain, and its nervous connections, on the contrary, are very imperfectly formed, though largely developed—more especially the brain itself.

We now come to the consideration of the second class of organs,—those of animal life, or relation to external objects; and here we shall find remarkable changes manifested in the advance of organs from a state of essential imperfection, to one of completeness—this advance in organization, and successive development of function, constituting the most interesting eras of infantile life, looked forward to with eagerness, and remembered with pleasure, as the periods of dawning intelligence, and independent muscular exertion—when the infant first begins to take notice, to walk alone, and to speak.

V.—CEREBRO-SPINAL (NERVOUS) SYSTEM.

The brain, though large in volume, is very imperfect in structure in the infant, being so soft as to be almost fluid, the quantity of aqueous matter preponderating much over the albuminous; it is of a reddish hue, but with the cortical portion less deeply colored than in adult age, and the convolutions less deeply marked.

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* This is the number given by Haller; Sömmering fixes it at 130. The frequency of the pulse in new born infants is not the greatest; nor does the pulse thence gradually diminish in frequency, as is commonly thought. The most general conclusion, our observations have enabled us to arrive at, is, that the pulse is most frequent at the age or at least the time of teething, and that it thence gradually diminishes in frequency. Valleiz, who has particularly investigated this subject, gives 87 as the medium frequency of the pulse during the first three weeks of existence. He found the pulse more frequent at seven months than at seven days: and thence it gradually diminished until the sixth year. Dr. J. Gorham states (as the result of his experiments) 130 to be the mean number of the pulse from five months to two years old; and 107.63 from two to four years of age; whence

The brain is altogether inadequate to perform, on first entrance into life, those exalted functions which afterwards render it so important an organ, and so characteristic of the superiority of man; and accordingly, we find the newly born child incapable of thought, and apparently devoid of perception.

As the action of the heart becomes more vigorous, the brain acquires more energy. The precise changes which this organ undergoes, in its progress towards perfection of structure, are not accurately determined; but those appear to be as important which regard alterations in the quality,* as in the quantity of the cerebral substance. The increase in size is not, perhaps, so remarkable as that in the density of the organ; which, according to Wenzel, does not attain its greatest weight until the seventh year,—the size and weight of the brain at that time being said to differ little from what they are at mature age, when the power of function is so far superior.

Such is the opinion generally entertained on this subject; but which is not strictly accordant to fact. The fact is, the brain does continue to increase in size until manhood; and the relative size of its different parts constantly varies during several of the first years of life; but it is not, perhaps, until about the seventh year that all its parts are fully formed.

The brain of the newly born infant, seldom exceeds ten ounces in weight; that of the adult averages about three pounds and a half—often something less—but in some individuals, the brain has exceeded four pounds, or even four pounds and a half in weight.

In advanced life, again, the brain diminishes somewhat in relative as well as general size, and it has been ascertained, according to Desmoulins and Cauzevielh that it diminishes in specific gravity, from one-twentieth to one-fifteenth. It grows rigid in its quality, becomes again unequal to the due performance of its functions, as it had before been in infancy, though from an opposite cause, and second childishness is said to take place.

The cerebellum is at birth somewhat more advanced in

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according to him, the number continues the same up to the tenth year. (See Medical Gazette for 1837.)

Every practical physician is aware how difficult it is, to estimate the pulse as an indication of disease in the infant or young child.—So many and so slight are the causes of disturbance, and altogether so insecure a guide is it in certain states and forms of disease. [Note to 5th Edition.]

* The presence of phosphorus constitutes an essential ingredient in the chemical composition of the brain, (as proved by recent researches,) and the quantity of this substance present in the brain of the child, is much less than in that of the adult, and again diminishes in advanced life. The brain of the idiot is found to be remarkably deficient in this ingredient.

organization than the brain; but it is about the period of puberty that the relation between the cerebrum and cerebellum undergoes the most remarkable change, the latter becoming considerably augmented in relative size, being then nearly twice as large, in proportion, as it had been at birth.

The spinal marrow is largely developed, like the brain, in the infant, but appears to be more matured in structure, and farther advanced in the performance of its functions.

The general sensibility is acute, and the nervous susceptibility in the infant remarkable; so that all impressions are vividly felt, although transient in effect, and sympathetic affections are presented in a very aggravated form, and are very prone to occur, constituting a peculiar feature in the infant constitution, which may be emphatically said to be nervous. The large endowment of nervous matter, and its peculiar susceptibility of impression from the softness of its texture, appear to confer this quality, which is never to be lost sight of in the treatment of infantile disease—a remark as old as the time of Boerhaave, but which is nevertheless too frequently forgotten.

As the infant grows older, the brain, the centre of nervous power, becomes capable of perceiving impressions made through the senses. Signs of intelligence begin to be manifested; the infant takes notice, and becomes sensible of the qualities of bodies, recognizing them and exhibiting symptoms of gratification or annoyance. The nerves of sensation, however, though freely developed, are as yet but imperfect in their functions, and inadequate to the conveyance of their appropriate impressions; while we find that the apparatus by which the external sources of these sensations are supplied, is more or less imperfect, and destined to undergo much alteration.

To notice particular senses, we shall commence with vision, which does not appear to exist in the newly-born babe, though the eye is fully developed; and it has been ascertained, that perfect images are formed on the retina. Vividly illuminated objects seem soon to attract notice; but the eye follows, or is fixed on them, at first, in an apparently passive manner, little dependent on the will. Light is at all times agreeable to the infant, which seems naturally to dislike darkness; but a very bright light is injurious, as well as annoying to the eye.

The sense of hearing is as little exercised as that of sight, in the first instance. It is doubtful if the young infant can hear at all; at least for some time it does so but very imperfectly; and that this must be the case is manifest, from the deficiency of structure in the external ear, which is as yet ill calculated to collect or receive vibrations of sound, the pinna being very inelastic, the tympanum small, and its membrane oblique, while a soft matter, little favorable to vibration, covers all.

Taste early exists, and provision is made for its exercise in the full development of the mouth; but probably perception of flavors is enjoyed to a less extent than we might at first suppose. The apparatus connected with the sense of smell, is much less fully formed; and although this sense be manifested early, there is little probability that delicacy of perception is early enjoyed by it.

The absence of speech, or of the capability of uttering articulate sounds, is a deficiency characteristic of infancy, (as indeed the word *infantia* implies,) but not to be accounted for by mere anatomical examination of the organs of voice, though these certainly are but imperfectly developed. The larynx is small, and nearly circular: the lips of the glottis, and the superior ligaments, being, therefore, very short. This condition of parts, combined with an immature muscular endowment, sufficiently accounts for the shrill, feeble tone, and wailing cry, peculiar to the infant; but the acquisition of the power of speech, is connected with the advance of intellect, rather than alteration of mechanical structure in this part of the apparatus of voice. The gradual alteration going on in the larynx, does not become very evident until the period of puberty, when the rima glottidis enlarges, the thyroid cartilage, and thyro-arytenoid muscle, become elongated, and a change in the tone of voice is consequently occasioned. In the male this assumes the deep and grave sound which characterizes the full toned voice of manhood; while in the female little change takes place in the larynx; and the acute tones still remain characteristic of the female voice, which always more or less resembles that of childhood. The mechanism on which depends the power of articulating intelligible sounds, is more connected with the increased growth and power of the muscles of the mouth and pharynx, which, even before intellect begins to dawn, become, by a happy provision, early developed, being necessary both for sucking and deglutition. The infant begins to articulate at from half a year to a year old; and usually speaks plainly, or so as to be understood by a stranger, at from two to three years of age.

The general sense of tact, or perception of contact, makes us conscious of the presence of external bodies; and, to a certain extent, is exercised by the whole cutaneous surface, though not in like degree. In the young infant, however, the skin does not seem well disposed for the active exercise of this power, the papillæ being less developed, and its structure more gelatinous than in after life. The sense of touch, strictly so called; or that perception by contact, in virtue of which we not only recognize the presence, but certain of the qualities of bodies, exists only in some organs—almost solely in the hands—and is but little developed in the infant.

Whether the skin be less sensitive or not, the muscular endowment necessary for the exercise of this sense is very imperfect,—the use of the fingers for this purpose being as yet unknown, or the attempts to employ them sufficiently awkward.

The assistance of muscles is necessary for the exercise of all the special senses; and the imperfection of the muscular apparatus is a principal cause of the deficiencies of these senses in the infant.

VI.—LOCOMOTIVE APPARATUS.

The organs of locomotion are those that enable us voluntarily to come into contact with external objects; and these organs are but little developed in the child, in either of their chief component parts, bone or muscle.

The osseous system in particular, is imperfectly and unequally developed, varying according to the purposes of its different parts. The bones necessary to contain and protect important organs, as the bones of the head or chest, are much more advanced in ossification than those destined merely for muscular support, or locomotion, which are but imperfectly ossified, or exist as yet only in the form of cartilage.* The bones in general are characterized by their smallness of size, redness of color, and softness of texture, being very vascular, and the earthy part not only much less in proportion than in the adult bone, but even the animal portion being less firm, in consequence of the larger proportion of gelatine. The bones in the infant, then, are little calculated, from their formation or structure, for the support of the body in the erect posture, or the endurance of strong muscular exertion; nor are the muscles themselves better prepared for such efforts.

We have already noticed the characters of the muscular tissues of organic life, or the involuntary muscles in the infant. Similar characters of structure belong to the voluntary muscles. They are pale in color, and easily torn, being soft in consistence, and slender in shape, the bellies of the muscles not being yet formed. They contain less fibrine than in after life, and have their fibres but loosely united, the fasciculi not being embraced by fasciæ or aponeuroses. Similarly imperfect are the tendons and ligaments, or muscular appendages. In the child, the irritability of the muscles, or tendency to contract, is more easily excited, but less easily sustained, than in after life. Hence the motions of the child are quick or sudden, and frequent, but fail in capability of effecting powerful action, or sustaining continued exertion.

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* "The most striking fact of this kind," to use the words of Dr. Symonds, in his able article, "Age," *Cyclopædia of Anatomy and Physiology*, "is presented in the spinal column. The annular portions of the vertebræ, which form the canal of the medulla spinalis are found strongly ossified at birth: but the bodies of these bones, which are to be used hereafter in supporting the weight of the head and trunk, are very slightly expanded, and all but devoid of earthy particles; while the processes to which the muscles employed in the flexion and extension of the column, afterwards contract attachments, are either only shaped in cartilage, or may be said to have no existence."

The first efforts of the infant at voluntary movements are thus necessarily imperfect. It begins to attempt walking at about twelve months of age, and has generally acquired the power of *walking alone* between the second and third year. But many are the mischances which such efforts entail; foreseeing which, nature has providently furnished a shield of defence in the yielding and elastic cellular tissue, in which the body of the child is so liberally encased.

VII.—GROWTH.

We have already designated infancy as the period of growth; and this character, which continues during childhood, is sufficiently manifested by the progressive and rapid advance made in the body at large, and its several organs in detail. The progress of this advance is uniform; so that the successive developments of different parts observe stated periods and a well known order.

In this progress we are most attracted by the advance made in the organs of animal life: but the changes which take place in the organic functions are not less remarkable, though less noticed; consisting principally of a decrease in activity, if not power, and occurring out of sight, so as to be little obnoxious to observation.*

As the infant grows older, digestion ceases to be so active and the digestive tube so sensitive. Food is less frequently required; and the kind of food may be more varied, a more stimulating variety being borne, and necessary. The secretions begin more to resemble those of adult life, and the evacuations require less frequently to be voided, being no longer passed independently of the will. The involuntary muscles generally acquire more tone, grow firmer in structure, and deeper in color, losing their *puerile* irritability.

Respiration becomes slower, gradually parting with the attributes of *puerility*, and is performed more by the aid of the ribs and less by the abdominal muscles.* The pulsations of the heart also become less frequent, and the pulse diminishes proportionately in rapidity.

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* In both systems of nerves, sensibility precedes activity, the course or current of *innervation* being, at first, from sensation to motion, although afterwards the opposite often obtains. There is also a certain correspondence between sensation and action, but this is more remarkable in the organic nervous system than in that of animal life; for in the former, action is directly proportioned to sensation, being in fact, a necessary consequence of it: but in animal life, this relation is uncertain, the result not being invariable, but controlled by the brain, through which impressions must pass, or in which they originate. [Note to 4th Edition.]

The activity of secretion becomes abated, and the membranes are not so vascular or sensitive. Less mucus is secreted naturally, or poured out on the occurrence of irritation. The capillary vessels are no longer so abundant, nor do the arterial branches preponderate so much over the venous.

As the child advances in age, the activity of the ganglionic system of nerves is less manifested, while that of the cerebro-spinal system comes more into play; and the body, gradually losing the characters of infancy, begins to assume the attributes of adult age.

In these various stages of advance, we are particularly struck by the progress made in the powers of sensation, perception, and voluntary motion, or in the organs of animal life. Sensation awakens, and the senses successively and rapidly expand. Perception is manifested, and reflection in due time succeeds. Thus endowed, the child is competent to voluntary efforts; and muscular power is proportionably developed, and brought into action. The several senses improve as they are exercised, and mutually aid each other by corroborating or correcting the impressions received by each.

Our perceptive faculties are thus brought first into action, and we obtain a knowledge of the existence and properties of external objects. Memory, "the store-house of the understanding," becomes furnished, and the intellect is supplied with the materials of knowledge, and business for thought.

The progress of growth in the organs devoted to the exercise of the senses, the intellect, and voluntary motion is remarkable and characteristic, but unequal in advance, and tardy in completion. The perfecting of these organs, finishes the process of growth; and is not fully completed until the period of maturity, or near to the meridian of life. Perfect development of the bones and muscles, connected with the apparatus of the organs of sense, is necessary for the full exercise of the several senses, and is not finally completed until long after the period of childhood; nor are the powers of sensation brought to perfection before them. The acuteness of the early impressions is probably great, whether in consequence of their novelty, or the sensibility of the nerves; and such impressions seem to be recollected as peculiarly pleasurable. But it is only by practised experience that the perfection of sensation can be attained, as is remarkably exemplified in the sense of touch.

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* About the age of three or four years, *costal* respiration is marked, and the influence of sex begins to show itself, according to Messrs. Beau and Massiot, who point out *superior costal* respiration, or that performed principally by the elevation and expansion of the upper ribs, as characteristic of respiration in the female. [Note to 5th Edition.]

The advance in the organs of voluntary motion,—the knitting of the frame and development of the muscular power, —constitute the most noted feature of growth; and the completion of these organs, the most characteristic attribute of manhood. The form of the skeleton, and its several parts, alters much; and the chemical constitution of the osseous system, also undergoes change. The relative development of the pelvis and lower extremities, comes to bear a better proportion to that of the thorax and the rest of the body. The form of the spine assumes more of the alternate curvatures of full growth. The shafts of the bones become firmer, and more closely united to their heads, and the processes shoot out; while the quantity of calcareous matter gradually increases, until the completion of bony growth, when the frame-work of the muscular system is brought to perfection.

The muscles do not remain stationary while the bones advance. Their color deepens, and the fibres become well-defined and firm, being developed so as to form the belly, or central fullness; more fibrine enters into their composition. The aponeurotic sheaths, and tendinous appendages, have become necessary, and are added. Muscular exertion now comes into busy operation, but continues to be characterised by activity rather than power. The child has a constant tendency to muscular movement, and loves exercise; but the power is soon expended, and rest is required,—well-concerted, or long-sustained muscular exertion being beyond its capability. This is an important moral as well as physical check, the corporeal power being limited, and full strength not acquired, until the controlling influence of a matured intellect has been provided.

This brings us to consider the progress of growth in the cerebro-spinal portion of the nervous system; particularly the brain, the organ of thought and feeling, and that in which remarkable changes take place.

As the body elongates, the spinal marrow of course becomes enlarged, until it bears to the brain a greater proportion in size than it did at birth; but having been more forward in structure from the first, its advance in this respect is less remarkable.

The brain grows, and the head enlarges remarkably, within the first year after birth—particularly, during the first few months. The imperfect state of ossification in the bones of the skull at this period, admits readily of the rapid enlargement of the cranium and its contents; this being one of the uses of the fontanelles, in addition to the facility which they can afford in delivery, by allowing the bones to overlap each other, and so diminishing the bulk of the head. Six of these deficiencies in ossification are found at birth, the spaces being covered by membrane: nor have the sutures yet begun to form. The principal of these openings is called the bregma, and is situated at the top of the head, between the frontal and parietal bones; another is found behind, between the occipital and parietal bones; and of the remaining two, (each of which is double, thus constituting six in all,) one is found in the temporal fossa, at each side, the other above each mastoid process. The presence of these fontanelles (particularly that on the top of the head) is a source of uneasiness to the ignorant, imparting to the hand an uncomfortable sensation, as if the brain was devoid of protection; and improper, and often injurious attempts are accordingly made to remove them, by compressing the head, for the purpose of bringing the bones together. But so far from being a cause for alarm, these openings are a source of advantage. The effects of blows or falls on the head, (to which the infant is so liable,) are thus mitigated, the shock being intercepted before it has affected the brain; while, in cases of disease, the danger from effusion is lessened by the possibility of quick expansion thus permitted, and which diminishes the effects of compression. These openings gradually close by a natural process, and will be found completely united by the fifth year, when the sutures are well marked and formed. Occasionally, the fontanelles are later in closing, the process of ossification being slow or imperfect; and this is a just cause for uneasiness, having its source usually in a general delicacy of constitution, often connected with a strumous taint.

The brain not only increases much in size in the child, but also alters sensibly in structure, advancing towards more complete organization; and this remarkably, at the time when signs of intelligence begin to be displayed. From about the period when the first teeth appear, this advance in structure is striking, that in size having been before more remarkable. The brain now becomes firmer, more consistent, and less vascular; the difference between the medullary and cortical portions is more striking; the former is less red, the latter deeper colored; the convolutions are better marked, and so the peripheral surface more extended. The advance in quantity and quality continues manifest to the age of seven years, or about the period of second dentition, which appears to be on many accounts remarkable. The brain has now assumed considerable volume, and its structure apparently resembles that of adult life; but after this period, advance in structure, and increase of size, may still be observed, though not so remarkably.*

The character begins now to be defined, and some indications of the mental endowments of the future man are afforded; the features form, and the physiognomy begins to exhibit traces of a marked disposition. But in regarding the countenance, we must take into account the development of the bones and muscles connected with the head and face, which occurs about this age: yet the general enlargement of the head is not so much connected with the expansion of the skull and its integuments, as some insist. When the circumference of the head, taken above the orbits, does not exceed thirteen inches in the adult, idiotcy always attends, according to Gall: and Dr. Voisin found, on careful examination, that idiotcy was complete, when this measurement varied from eleven to thirteen inches; while that from the root of the nose over the head, to the occipital spine, measured only between eight and nine inches. In the full-sized head, the former measurement averages two and twenty inches; the latter fourteen. A very small head is usually accompanied by feebleness of character; but the head may be large, and the person dull, or even idiotic,—the deficiency existing in the structure or quality, not in the size of the brain.

The advance of growth in the brain does not seem to proceed equally, either as to size or structure, in all parts. Vimont notices, that the increase of size, during the first months, is most remarkable in the parts situated at the base of the skull, and occupying the anterior and inferior regions of the frontal bone; while, of the cerebral convolutions, those soonest acquiring firmness of structure, are placed in the lateral and middle parts of the base. All know that the cerebellum does not acquire its full development, until about the period of puberty.

The head varies with the progress of growth not only in size, but shape,—the different regions of the brain being found to bear a different relative proportion at different ages—particularly, during youth; while at all periods there exists a certain degree of individual peculiarity, and a capability of alteration in size, whether by increase or diminution.

Not less remarkably do we observe a certain order or relation in the successive development of the several moral and intellectual powers; which is, doubtless, dependent upon this relative advance in size or structure in different parts of the brain, though not yet generally confessed to be directly connected therewith,—observations for determining this point having been but partially made, and the importance of this subject not yet duly appreciated. However this may be, it is certain, that the disposition and intellect are gradually unfolded; and that attempts to force the one or the other before its appointed time and proper progression, are sure to be attended with injurious, if not dangerous consequences. The reason is obvious and physiological; because, what is called the cultivation of the mind, is in truth but the exercise of the brain; and this, like every other organ, if over-tasked, will be debilitated or destroyed.

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* The concretions of the pineal gland have begun to form about this period; and they are redder in color, but fewer in number, than in after life; in some instances, however, they never form.

In noticing the development of the intellectual powers, we see that the child observes before he reasons—that the perceptive faculties come into play before the reflective. The child early observes and recollects things, and the qualities and relations of things; and is inquisitive about events. He constantly asks what this or that is.

But the senses advance still more rapidly than the perceptive faculties, and are thus prepared to furnish these faculties with knowledge of the various properties of matter. The difference to be observed, however, in the power of appreciating these qualities of bodies, depend on differences in the constitution of the perceptive faculties—not of the senses. The eye may see well, and clearly perceive differences in size or form, and yet not be able to distinguish differences in colors; the ear that hears best, is not that which best appreciates those variations in sound that constitute melody.

The various degrees of talent exhibited by some children more than others, depend much on the different degrees in which they are endowed with those faculties that take cognizance of the physical properties of things. In these qualities and relations of bodies we have the foundation of the physical and natural sciences; and for these sciences, (especially the latter,) mental capacity exists at a much earlier age than seems commonly supposed.

The gift of language as a mental power, is that which earliest attracts attention, and is first cultivated. Hence, facility in this respect, with a quick observation, are taken as indications of great intellectual capacity. But the reflective faculties must be in full operation, to constitute a really good understanding; and these are always the latest to be developed, and are often not very liberally bestowed. It is, indeed, upon a due balance between the reasoning and perceptive faculties, that the superiority of the intellect will depend. Where the latter preponderate, they early show themselves, and give a quickness of apprehension which, in the child, is often taken for superior talent. But the smartest boy does not necessarily make the cleverest man; there must be a full endowment of the reflective faculties, to give depth of thought, or soundness of understanding. When these faculties early preponderate, however, the child may be slow in apprehension, and will probably be esteemed dull; but when the period for their exercise arrives, powers will be exhibited which had not been anticipated. Peculiarities of disposition, moreover, affect these results as much as differences in talent, though seldom, if at all taken into the account. A careless disposition will often forfeit all advantages of superior intellect; while persevering industry may more than compensate for the absence of brilliant talents. The child often exhibits (from the earliest age) a marked disposition, as occasionally it does some peculiar talent. Almost from the moment of birth some infants are observed to be peevish, passionate, and obstinate; while others are gentle and affectionate, or timid. A determined infant may be seen to rule a weak parent, and even exercise an influence over a whole family. A very gentle child may never acquire sufficient force of character to make his way in the world, no matter how intellectual he may be.

The higher sentiments, generally speaking, are the more slowly developed; and superior moral powers, as the sense of justice and religion, are among the latest to come into operation, requiring some assistance from the understanding for their direction and support. Before we are generous we should be just; but to be just we must be wise—knowledge is necessary to justice.

No doubt can exist that the child is endowed with certain powers, moral and intellectual, varying in different individuals, and constituting natural differences of character; but this militates not against the necessity for education or training, and the vast influence exercised thereby; on the contrary, it serves as a guide and a limitation,—pointing out what requires to be cultivated, and what to be repressed; and shows us what is possible to be done.

How important, then, to acquire a knowledge of the primitive faculties of man, and the laws by which they are regulated in their natural development, or influenced by artificial training. Nor is the necessity for such knowledge confined to the system more immediately connected with mental manifestation. The same holds good respecting all the other systems in the body, muscular, circulatory, and digestive, as well as nervous; for without due attention to each, we shall not be able to do justice to any, nor secure for the whole its best advantages during the period of development or growth.

With regard to the general growth of the body, and the advance in height, weight, and strength, differences arise from age and sex; and these have been accurately investigated by M. Quetelet.[*]

According to him, the average weight of the male infant at birth, is about half a pound more than that of the female, and the length about an inch more; and the annual growth of the female infant is less than that of the male, but her development is more early completed. Immediately after birth, the weight of the infant is found to diminish; nor does it begin again sensibly to increase until after the first week.

The growth of the stature is most rapid during the first year, when it amounts to nearly eight inches; it is less rapid as the child approaches the fourth or fifth year, appearing to diminish in direct ratio to the age, up to that time; the growth in the second year being only half that of the first; in the third year,[†] only one third; but afterwards it increases with a tolerably regular progression.

A remarkable difference is often to be observed in the degree of development, or proportional growth of one organ or system of organs more than another, and in the consequent predominance of the class of functions which this system of organs performs. In some children the head is very large, and great liveliness and intelligence are early displayed, the cerebro-spinal system of nerves being that which preponderates; and this lays the foundation for a particular temperament, which, according to the rational view of M. Thomas,[‡] would, in this instance, be the cranial or nervous temperament.

In other children, great muscular power is early displayed, the chest is large, the body well nourished, and the complexion florid. This constitutes the thoracic, or, as it is more commonly called, the sanguineous temperament—the circulatory system predominating. The child is strong and active, but not particularly intelligent.

When the abdomen is very large, and the circulation languid, —the child being pale, indolent, and dull, with a large appetite, but little activity of mind or body,—the abdominal organs preponderate, and the temperament is abdominal or lymphatic.

The expression of the countenance or form of the features is also some indication of the temperament. Thus, the development of the forehead indicates the proportion of the encephalon: the part between the forehead and mouth is, in general, in harmony with the development of the thorax: while the lower part of the face is in relation to the size of the abdomen; so that in each we have an index of the temperament, whether cranial, thoracic, or abdominal.

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[*] Sur l'Homme et le developpement de ses facultès, &c. &c.

[†] It is a popular observation that the height is never more than doubled after the third year, the maximum *medium*, particularly in females, being attained at that age. [Note to 4th Edition.]

[‡] See Physiologie des Temperamens ou Constitutions, &c. &c., par F. Thomas, D. M. P.

Other varieties of temperament exist; and in some individuals no temperament is strongly marked; or more than one are mixed together;—the mixed temperament existing, when the cavities bear an exact proportion to each other. In infancy and childhood the abdominal temperament has a tendency to prevail. The nervous or cranial becomes more particularly manifest at or after the age of seven, when, as we have seen, the brain attains a full development; while the thoracic rather belongs to a later period, when the thoracic organs (at first so little developed) begin considerably to increase. Attention to this subject is important, as modifying our plan of management both in health and disease.

These varieties of constitution may be born with the child, or looked on as hereditary:, but they will be much influenced by the manner in which the individual is managed; according as one system of organs, or another, is exercised or neglected. The great principle that should guide us is, to afford to all and each its proper or appropriate share of exercise or occupation, so as to strengthen and even enlarge the weak or ill-developed organs; while we repress those that are disproportionately developed, or over active, by consigning them to quiescence. To be enabled to do this, however, we must study the subject as physiologists.

Thus have we, in a brief and summary manner, sketched those peculiarities of infancy, a knowledge of which must serve as our guide in understanding aright the management of children in health or disease. This object we have kept exclusively in view, and resisted the temptation of pursuing any of these subjects, however interesting, further than the end proposed would warrant.

We have seen the infant presented to us, in the first instance, as a mere vegetative being, with the organs of nutritive life preponderating in development and activity. As growth proceeds, however, the little being asserts its claim to a higher order of existence. The organs of organic life diminish relatively in importance, while those of animal life advance, and ultimately preponderate—the infant becomes a rational being.

To promote this preponderance, and insure the *mens sana in corpore sano*, is the great end proposed in the rearing and management of children. The principles by which we are to be guided in our attempts to attain this object, have been already pointed out; and the manner in which these principles are to be carried into effect, will constitute a chief part of the subjects treated of in the two ensuing chapters.

CHAPTER III.

MANAGEMENT AND PHYSICAL EDUCATION OF CHILDREN.

In the consideration of the subject of this chapter, we shall adopt the division already made, into the two epochs of infancy and childhood; and will, therefore, first proceed to consider the management of the infant directly after its birth.

I.—MANAGEMENT IMMEDIATELY AFTER BIRTH—WASHING AND DRESSING.

Let us suppose a healthy child to be placed in our hands immediately after birth; the duty of the accoucher having been duly performed, any mucus, or other matter likely to obstruct its breathing, has been removed from its mouth, and the cord has been tied and divided at the distance of three or four inches from its navel. The young being will be observed to cry stoutly, and to move its limbs in such a manner as forcibly to convey to us the impression that it is suffering pain, which we can readily account for, when we recollect that it has experienced a sudden transition of temperature, from the heat of the mother's body, about 98°, to that of the atmosphere, which, at the highest, will seldom exceed 70°. The production of pain, however, is but a necessary consequence of the access of air to the surface of the body; which in itself is highly beneficial, exercising, as we learn from the ingenious researches of Dr. Edwards,* a vivifying influence, well calculated to counteract the greater or lesser degree of insensibility induced by the pressure to which the brain is subjected during birth. The pain, also, by exciting the infant to cry, contributes materially to the perfect filling of the lungs with air; the non-effecting of which, as we shall subsequently find, is not unfrequently attended by fatal results. Such are the good effects of exposure to cold; it should however be but momentary, as its continuance would certainly be productive of the worst consequences to the well-being, and even existence of the child.

"Instinct," says Dr. Edwards, "leads mothers to keep their infants warm, though philosophers, by more or less specious reasoning, have, at different times, and in different countries induced them to abandon this guide, by persuading them that external cold would fortify the constitutions of their children, as it does those of adults." To this distinguished physiologist we are indebted for the observations, that the heat of mature infants at birth, is from 3° to 5° less than that of adults—varying between 93° and 95°; that the heat of premature infants is still less; and that the power of producing heat being, in all young animals, at its minimum at birth, they have not the same capability, as adults, of resisting a diminution of their temperature, from exposure to cold. From Dr. E.'s discoveries, indeed, we are fully warranted in concluding that the philosophers of whom he speaks are in the wrong; and that nature has, with her usual wisdom, conferred a proper instinct upon mothers, in teaching them to keep their offspring warm. It is for us, therefore, immediately upon taking charge of the newly-born child, to have it well wrapped up in soft, warm flannel; to take care that, in cold weather, it shall be dressed in the neighborhood of a comfortable fire; and that, during the operation, it shall not be unnecessarily exposed to cold.*

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* Dr. Edwards on the Influence of Physical Agents on Life. Translated by Doctors Hodgkin and Fisher.

When we examine more carefully the body of the infant, we shall find that it is more or less covered with a white, greasy, or curd-like substance. This is denominated the *vernix caseosa*, and appears to be provided for the purpose of defending the tender skin from the injurious effects of the warm, aqueous fluid in which it floats while in its mother's womb. After birth this coating has no useful purpose to serve; and would be injurious, by obstructing the pores of the skin, and by intercepting the vivifying influence of the air of which we have already spoken.† It is, therefore advisable to remove it; and, accordingly, the first act of the nurse is, to wash the new-born child. The washing should be performed with warm water, and a fine sponge; and as the soft bones of the infant render it unfit to bear much pressure from the hands, the operation will be most safely and conveniently effected by placing the body and limbs in a basin containing a sufficient quantity of water to cover them, while the head is suffered to rest upon the left arm of the nurse. The eyes should be washed with particular care, and clean water used for this purpose, as the allowing of impurities to remain in contact with these tender organs is the most common cause of the dangerous opthalmia of infants. All extraneous matters should also be removed from the folds of the skin in the groins, arm-pits, &c.; but no force likely to hurt the surface should be employed, nor need any extraordinary anxiety be felt for the perfect removal of the *vernix caseosa* as it never fails to dry and scale off in a day or two: we have not found soap to be required, although it is recommended by many writers. In this country, where whiskey is in universal use, nurses generally employ a little of it for washing the child's head, under the idea that it prevents the taking of cold. This practice is certainly not a necessary one in ordinary cases; but at the same time, it does not appear to be attended with injurious consequences: and when we can say so much for any popular custom, it is as well to let people have their way, and to direct our own attention the more closely to the prevention of such interference as may be really prejudicial.

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* The views of Dr. Edwards have been practically confirmed by some observations of Dr. Milne Edwards, and Dr. Villermé. It is the custom in France, to convey infants, within a few hours from their birth, to the office of the mayor of the commune, in order that their birth may be registered; and Drs. E. and V. discovered that the proportion of deaths, within a very limited period after birth, compared with the total births, was much greater in winter than in summer,—in the northern and colder, than in the southern and warmer departments,—and in parishes where the inhabitants were scattered over a large surface of ground, than in others, where they were more closely congregated around the mayor.

† If any authority were wanting for the removal of the *vernix caseosa*, we have it in the practice, which obtains universally among animals, of licking their offspring immediately after birth. [Note to 1st Edition.]

In a note by the German translator of this work, we find Oesterlen (*Œtiol. und Pathol. der Krankheiten neugeborner Kinder: Heidelberger Klinische Annalen 7ter Band 1stes Heft*, 1831,) quoted in support of a different view of this subject. This author, it appears, is of opinion that the chief use of the *vernix caseosa*, is found subsequent to birth, and that it is designed to protect the skin from the over-stimulating effects of the oxygen of the atmosphere. He states that premature children have a smaller quantity of this covering than those born at the full time, and that the deficiency is in proportion to the immatureness. Such has not been the result of our observations, nor have we noticed the ill consequences which he attributes to the removal of the *vernix caseosa*, viz. aphthæ, jaundice and opthalmia. [Note to 4th Edition.]

The washing having been accomplished, with as little delay as possible, and the surface carefully dried with a soft napkin, the next business of the nurse is, to dress her charge. This process is commenced by an arrangement for the protection of the remnant of the navel string. The cut surface of this should be carefully examined, lest, as frequently happens, secondary bleeding should take place, in consequence of the loosening of the ligature, dependent on the oozing out of the gelatinous fluid, which makes up the bulk of the cord. This occurrence is most likely to take place when the cord is particularly thick, and the gelatinous fluid very abundant, as the pressure of the ligature is then less directly applied to the vessels. When hemorrhage has taken place, a fresh ligature must be applied firmly, and its ends cut off close to the knot. The cord is then to be drawn through a small circular hole, cut in a piece of old linen, about four or five inches in diameter, which is to be gently folded round it. In the preparation of this envelope, nurses are particularly anxious to have it extremely dry and warm. It is always held carefully to the fire, and sometimes even scorched, before they will permit its application—a prejudice which is certainly harmless, and probably but one indication of the general instinct which teaches them that a new-born infant requires its heat to be carefully husbanded.[*] The cord, thus enveloped, is to be placed flat upon the child's abdomen, and secured there by a band of thin flannel, five or six inches broad, and long enough to go twice round the body. The chief use of this band is, to support the navel string and its covering: we cannot think that it is required, as Dr. Dewees[†] supposes, as a support to the abdomen; indeed, it never should be applied so as to make any pressure upon that cavity; and on that account, it is well to have it made of the thinnest flannel, cut diagonally or bias, so as that it may be perfectly elastic. In fastening it, pins are usually employed; but the fewer of these used in dressing an infant, the better; and it would be well, if we could have strings substituted for them in every possible case. The further dressing of the body of the child, is very much a matter of fashion, with which the physician has little to do further than to see that the clothing is light, soft, and sufficiently warm, and not calculated to set any restrictions upon the movements of the chest, abdomen, or limbs. It would now be a work of supererogation, in this country, to denounce the swaddling of the limbs practised in former times; but we cannot too forcibly impress the necessity of avoiding all constriction or pressure upon the chest or abdomen. The due performance of respiration is of the first importance to the young as well as to the adult animal, and this will be materially impeded by any restriction upon the free motion of the ribs or diaphragm such as would be occasioned by tight bandages upon the body of the child. The arrangement of the head dress must be conducted upon principles similar to those which guide us with respect to the other clothing: the head is to be protected from the cold air by a moderately thick, muslin cap, but so as that it shall neither suffer compression, nor be placed in a constrained position. Over all, a thin flannel shawl is to be wrapped in such a way as will not impede the free access of air to the mouth, or hamper the extremities, so as to prevent their spontaneous movements. The infant is then to be placed in a cradle or bed, so situated, as that it shall not be exposed to draughts of cold air; and that, while it is not absolutely in the dark, still its eyes shall be protected from a strong light, which as yet they are unable to endure: thus placed, it will usually fall asleep, and remain so for several hours, until awakened by the calls of hunger.

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[*] As a curious instance of this dread of abstracting heat from the child, we often find the peasants of this country, carefully warming the scissors, before using it for the division of the cord. It is easy, and, no doubt, appears scientific, to ridicule popular customs and superstitions; but would it not be more discreet and philosophical, to endeavor to discover their origin from some instinct to which they may generally be traced?

[†] On Physical and Medical Treatment of Children. London. 1826.

II.—FOOD AND MEDICINE IMMEDIATELY AFTER BIRTH.

During fœtal existence, the various organs designed for the performance of digestion, produce a greater or lesser quantity of their secretions; and, as there is no exit provided for these, they accumulate in the intestines of the child, constituting the dark green, or pitch-like substance denominated *meconium*. By many persons even at the present day, the retention of this meconium is supposed to exert a most baneful influence upon the health of the child; and it is believed that no time should be lost in effecting its speedy removal. Accordingly, very few children in this country, are fortunate enough to escape being dosed with castor oil, immediately upon their arrival in the world; and many are obliged to undergo the additional peril of having a quantity of calomel forced down their throats. Neither of these practices, however, is constantly necessary, and the last is positively injurious: the delicate mucous membrane of the child's intestines, only fitted for the reception of the mildest nutriment, is always injured by the operation of a medicine so active and so irritating as calomel. To the milder action of castor oil, the same objection does not apply; and where the abdomen of the child is full, and no evacuation takes place for five or six hours after birth, it will usually be found advantageous to administer half a drachm of oil, provided we can procure it fresh, and free from rancidity.* We are, however, decidedly of opinion, that it is better and more natural to allow an infant to sleep quietly for five or six hours after birth; and not, before that period, to disturb it, or irritate its stomach, by the administration of any thing whatsoever. Those who advise the immediate employment of purgatives, assert that such practice is consistent with the plans of nature,† inasmuch as they suppose the milk first secreted by the mother (or *colostrum* as it is termed) to possess a purgative property. The argument is obviously a contradictory one; for, if nature herself provides a purgative, why should we seek to supersede her efforts by artificial means? The fact, however, of the first milk being purgative, is not proved, and is altogether denied by some.‡ It is probable that it possesses no specific purgative quality, but merely excites the intestines by mechanical distention, and so in effect produces expulsion of the meconium, as other food is found to do in cases in which it is given in consequence of the secretion of milk not being established in the mother's breasts, for two or three days after labor.

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* This is a matter of considerable importance. In the interior of Germany, where, in consequence of the long land-carriage to which it is subjected, castor oil is almost universally rancid, this purgative is considered as peculiarly irritating. [Note to 3d Edition.]

† Dewees.

‡ Jörg, Handbuch zum Erkennen u. Heilen der Kinderkrankheiten.

So much for medicine, immediately after birth; and upon the principle, viz., that sleep is what the infant most requires, we do not think it necessary to give it food, for some hours. Should the mother be able to supply the natural nutriment at the end of eight or ten hours, or even earlier, as is often the case, we think the infant should be then applied to the breast; and that it is highly desirable to avoid giving, in the interim, any other food whatsoever. Should the secretion of milk not be perfectly established for two or three days, as sometimes happens, the child will become cross and evince signs of hunger, and we shall then generally find it necessary to give a small quantity of thin gruel, mixed with a little milk. Even in these cases, Professor Jörg recommends, that nothing should be given but a few teaspoonfuls of lukewarm water; and we happen to know that such is his practice, without any bad results, in the Lying-in Hospital of Leipzig. Notwithstanding this, however, should it not be practicable to have the child suckled within ten or twelve hours after birth, we think it advisable to give, every five or six hours, a few teaspoonfuls of such food as has been mentioned above, but to desist immediately upon a nurse being procured, or the mother becoming herself capable of supplying sufficient nourishment.

Having premised thus much respecting the attentions required by the infant immediately upon its entrance into the world, we shall now proceed to consider its further management with regard to food, cleanliness, clothing, sleep, exercise, medicine, and the action upon it of physical agents, as light, air, and heat.

III.—FOOD IN THE FIRST PERIOD.

It is unnecessary to go at any length into the question of the propriety of mothers nursing their own children; the weight of the moral and physical considerations which leave no choice as to the propriety of obeying the dictates of nature, being now universally acknowledged. Women are not, at least at the present time, and in these countries, the unnatural deserters of their offspring that systematic writers would lead us to suppose; and, we think, most experienced physicians will join us in declaring, that our duty less frequently is, to urge maternal nursing, than to explain, and even enforce, in individual circumstances, the exceptional causes whereby nature herself sometimes renders it impossible or inexpedient to comply with her general law. We are, in fact, oftener obliged to save an infant from destruction, and a delicate mother from injury, by forbidding ineffectual attempts at nursing, on the part of the latter, than we are called upon to remind a robust and healthy parent of the urgency of the natural claims upon her. We shall therefore assume, as a general rule, that all mothers should nurse their own children ; and merely indicate those cases in which it becomes necessary to substitute another mode of rearing the child.

Women who labor under any mortal or weakening disease,—as phthisis, hæmorrhages, epilepsy, &c.,—are obviously disqualified for the office of nurse. Some, who are in other respects healthy, have breasts incapable of secreting a sufficient supply of milk, and this may be temporarily the case with one child (especially the first) while upon other occasions the same individuals may make excellent nurses. In other instances the breast may perform its functions well, but the nipple may be naturally so small, or may be so completely obliterated by the pressure of tight stays, as not to admit of its being laid hold of by the child. These are actual, physical hindrances to nursing. Again, women may, and in the higher classes frequently do, possess such extremely sensitive and excitable temperaments as would render it imprudent for them to suckle their own children. Frightened and excited by every accidental change in the infant's countenance, and inordinately moved by the common agitations of life, such persons are kept by their own tenderness, and over-anxious desire to do their duty, in a state of continual fever, which materially interferes with the formation of milk, both as to quantity and quality. Women, also, who become mothers for the first time at a late period of life, have seldom the flexibility of disposition, or the physical aptitude for the secretion of milk, required to constitute a good nurse. Another disqualification for nursing we must notice, although we hope and believe that it is rarely observable among our country-women : if women of fashion are not contented to give up their engagements in society in favor of their domestic duties, it is better for them not to undertake the latter—"In this matter," says Wendt, "it is better to do nothing than only half."

We have already stated, that the child should be put to the breast as soon as the latter contains any thing for it to extract ; this generally happens when the mother's system has been relieved, by sleep and ten or twelve hours' rest, from the fever which is always, more or less attendant upon labor. Unless there has been *some* secretion of milk, it is better not to apply the child, as it becomes disappointed by continued, ineffectual attempts at obtaining nourishment, and there may subsequently be some difficulty in getting it to engage seriously in the business of sucking.* As soon, however, as it has fairly commenced, it will require no other food; and if the mother be a good nurse, she should be able to support her infant independently of artificial nutriment, during at least two thirds of the period of infancy,—that is to say, until the seventh or eighth month. About that time the teeth usually begin to appear, indicating that the digestive system is assuming a capability of doing more work than it was adequate to at first; and accordingly, we should then, taking the hint from nature, begin gradually to train and exercise its powers. The suckling of the infant, which during the first months should be performed at regular intervals of about four hours, should now be repeated not more than three or four times during the day and night; and twice during the same period some artificial food should be given. This at first may consist of soft bread, steeped in hot water, with the addition of a little sugar and fresh cow's milk; subsequently some light broth, free from fat and vegetable matters, may be given once during the day. With respect to the *mode* of feeding at this period, the spoon will be the best vehicle, as it is an object to give food somewhat more solid than could be drawn through the sucking bottle. The child, however, should not be placed horizontally on its back, and gorged until it is filled to the throat, as is often done; but its head should be kept elevated, and its actions be carefully attended to, so that the supply may be stopped the moment it appears to be satisfied.

During the first five or six months, the infant must be suckled during the night as well as the day, but this should be done at regular intervals of four hours; and if it sleeps with the mother or nurse, the nipple should not be allowed to remain in its mouth, as it is not our object to keep the stomach constantly full, but to give it time when full, to digest its contents. A child nursed as we have recommended, will be found to awaken with a good deal of regularity, at the proper periods for its meals. During the process of weaning, the intervals between the times of suckling at night, may be at first gradually lengthened: but in order to insure unbroken rest, at a subsequent period, both for the attendants and child itself, it is very desirable not to accustom it to receive any artificial nourishment during the hours proper for sleep.

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* We have heard the propriety of the advice given above, called into question. Practical men will, however, have no difficulty in understanding the advantage of preventing the disappointment of the child, and the injury to the nipple itself, sometimes occasioned by protracted drawing at an *absolutely empty* breast: this is the utmost extent of delay which we wished to recommend, and to this recommendation we must still adhere. [Note to 2d Edition.]

In nursing, the infant should be put alternately to each breast; as a neglect of this precaution will frequently be followed by an unequal lateral growth of the body, limbs, and even head; and sometimes by squinting. Such deformities (all except the last named) are commonly not permanent; disappearing as the child grows; but it is better to avoid. them in the first instance.

We have been hitherto supposing the mother to be a perfect nurse, and the relative supply and demand to be well adjusted between her and her infant; but these are not exactly the cases which we always meet with in practice. We shall frequently have a demand greater than the supply, long before the seventh or eighth month; and in such instances, we shall be obliged to give food at an earlier period, and often find it to agree well, if its kind and administration be regulated upon the rules just laid down. The great maxim to be observed is, *not to let the infant want nourishment which will agree with it.* If this can be furnished by the mother alone, so much the better; if the deficiency can be supplied by artificial food, without the infant suffering, there will be no necessity for making any further change: but if neither of these conditions obtain, we must have recourse to a strange nurse.

As we have stated it to be desirable, that as much as possible of the infant's nourishment should be derived from the nurse, it, of course, becomes an object to render our source of supply as available as may be; and we are, therefore, legitimately called upon to consider how this may be done most efficiently. The grand secret, in a word, is, to keep the nurse in good health; if we succeed in this, we render the milk, both as to quantity and quality, as good as it can be produced by the individual. Now how is this to be done? Is it by overloading the stomach with a mass of indigestible food and drinks, and keeping the system under a continued fever of digestion? or, is it not rather by allowing the person to live, as much as possible, in the manner customary with her, supposing that to be one which has hitherto preserved her in good health,—permitting her to eat her usual meals, which she will probably do with increased appetite, and not inculcating upon her the necessity of taking drinks more stimulating, or in larger quantities, (relatively with her probably increased consumption of food,) than she has been in the habit of using? With hired nurses, it is especially necessary to act upon the principle just laid down; for these persons coming from the scanty table of their own homes, are apt to indulge their appetites, from mere novelty, if, as is usually the case, their employers show any disposition towards the encouragement of a high-feeding system. Nurses should not be kept upon any one description of food exclusively, but should have, as is natural, a wholesome, mixed, animal and vegetable diet, with or without wine, according as they may have been accustomed to live; but we may, perhaps, allow them, with advantage, somewhat of an extra, though never an unreasonable, quantity of malt drink, providing always that it be found to agree with their digestive system.

The catamenia, in some instances, appears in a nursing woman, and, where it does, is likely to interfere with the thriving of the child. Whenever, therefore, we find an infant becoming thin, weakly, and cross, without any sufficient cause being assignable, we should inquire into this circumstance, and if a change has occurred, it will generally be found advisable to procure another nurse; or to anticipate the time of weaning.

Irritability of temper, and indulgence in passion, interfere with the secretion of milk to such an extent, that a child has been known to be attacked with convulsions immediately after being suckled by a nurse, who was at the time suffering under the effects of a fit of anger. A knowledge of this circumstance influences many persons to indulge nurses in the most extravagant whims, lest their temper should be crossed, and the child thereby injured. Irritable persons are, unquestionably, unfitted to nurse or manage children; but we apprehend that over-indulgence is not the way to improve temper, and as we fear that the most learned diatribe from us would have little efficacy in supplying a good disposition where Providence has not created it, we shall not pursue this subject farther.

IV.—CHOICE OF A NURSE.

When circumstances prevent a parent from suckling her own child, it is important that we should have some principle to guide us in our selection of a strange nurse. Medical men are constantly asked for an opinion upon this subject, and we shall therefore lay down a few rules, which may be useful in enabling us to form one. The great thing we have to look to is, to ascertain that both woman and child are in good health; and of this we must endeavor to judge from the following signs:—The woman's general appearance and form should be observed; and they ought to be such as betoken a sound constitution. Her skin should be free from eruptions; her tongue clean, and indicating a healthy digestion; her gums and teeth sound and perfect; the breasts should be firm, and well formed,—not too large, or flabby,—and with perfect, well-developed nipples. We should see that the milk flows freely, upon slight pressure; and we should allow a little of it to remain in a glass, in order that we may judge of its quality.* It should be thin, and of a bluish-white color; sweet to the taste: and when allowed to stand, should throw up a considerable quantity of cream.

A nurse should not be old; but it is better that she should have had one or two children before, as she will then be likely to have more milk, and may also be supposed to have acquired experience in the management of infants. The more recently the nurse's own confinement has taken place, provided she has recovered from its effects, the better, as we may count upon her services so much the longer. It is, however, not generally a serious objection should two or three months have elapsed after that event. Having examined the mother, we must next turn to the child, which should be well nourished, clean, and free from eruptions, especially on the head and buttocks. We should, also, carefully examine its mouth, to ascertain that it is free from sores or aphthæ. If both woman and child bear such an examination as we have mentioned, we may, with tolerable security, pronounce the former to be likely to prove a good nurse.†

V.—ARTIFICIAL FEEDING.

What we have already stated as to the management of an infant's food, negatives altogether the question of the propriety of ever *choosing* to rear a child entirely by artificial feeding. Certain cases, however, occur, in which we have no alternative. Peculiar circumstances may preclude the possibility of procuring a nurse; or an infant, whose mother is incapable of nourishing it, may be the subject of some contagious disease, to contamination by which, we cannot, in common honesty, permit a stranger to be exposed. The necessity of resorting occasionally to artificial feeding, obliges us, therefore, to consider how we can render it least injurious; for such is really the question, although, we do not mean to deny, that in certain instances extremely healthy children have been reared in this way. These are, notwithstanding, but exceptions; for a very extended experience, in different countries, has proved that spoon-feeding is generally unsuccessful.

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* Nurses who have not a good supply of milk will, occasionally, be found to adopt a practice commonly employed with milch cows when brought to market, and called by the cattle dealers, *stocking;* that is, they allow the milk to accumulate in their breasts for several hours before presenting themselves for examination, so as to cause the examiner to believe that they are very abundantly provided. Young practitioners should be especially on their guard against this deception.

† The following is the beau ideal of a good nurse, according to Wendt. Some of its Germanisms may amuse. "Youth, fullness of health, plenty of milk, and a good build of breasts and nipples—a rather phlegmatic temperament—a quiet disposition, and no inclination to sensuality or dissolute habits,—a white, delicate skin, traversed by blue veins, and covered with freckles,—fair or reddish hair, large blue eyes, sound teeth, a fresh breath, a clean skin, no disagreeable odor, no unnatural discharges, a bluish-white,—rather thin, than thick and tenacious, milk, which dropped upon the thumb-nail, flows off rather quickly,—it should have no smell, and a mildly-sweet taste,—along with these, large and firm nipples, a clean person, and a harmless temper,—form the ideal of a good nurse."—*Die Kinderkrankheiten systematisch dargestellt von Dr. Johann Wendt. Wien*, 1827, *2te ausgabe.*

The kind of artificial food proper to be employed, forms the subject of our first inquiry; and, as a general rule, we may say, that it should be as like the natural nutriment as possible. This rule, however, is easier laid down, than acted upon; "for nature," says Dr. Prout, "will not permit the chemist to officiate as her journeyman, even in the most trifling degree."* In the present state of our knowledge, then, it is vain to attempt the preparation, upon chemical principles, of a food resembling human milk. It will be better to be satisfied with employing the food of some other young animal, and modifying it, so as to make its sensible properties, as nearly as possible, similar to the milk in question. For this purpose, good cow's milk is usually the most convenient; and as it is thicker and whiter, and not so sweet as human milk, we may add to two parts of it, one of very thin barley water, and sufficient white sugar to make the necessary increase in sweetness. Asses' milk approaches more nearly, in sensible properties, to what we require; but it is richer, and requires to be diluted with about a third part of water. So modified, it may be used, if the cow's milk disagrees, or if it can be conveniently procured. As the child becomes a little older, thin bread pap, made as we have already directed,† may be advantageously employed; and it will also be advisable to give, occasionally, some light beef or chicken tea. In managing spoon-feeding, all our ingenuity will frequently be required for varying the kinds of food; as one which agrees well with the infant at first, may, after a little, derange the bowels,—producing acidity, gripes, and purging, or perhaps costiveness. Thus, prepared barley dressed with water and unboiled milk, will sometimes purge,—an effect which may be obviated by having the milk boiled. In other cases, we must employ arrow root, for a short time, for the purpose of restraining the bowels, and again recur to the barley when costiveness has been produced. A great matter is accomplished, if we can prevent the production of acid fermentation in the stomach and bowels; and on this account, we must be most particular in requiring every article of food to be freshly prepared before use, and in enforcing the strictest attention to cleanliness with respect to every vessel employed. All kinds of food should be used tepid or lukewarm; that is, at about 96° or 98° F.—the natural temperature of milk as it would be obtained from the breast by sucking.

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* Gulstonian Lecture, 1831.

† Page 53.

Our second inquiry relates to the mode of administering artificial food. This may be accomplished either by the spoon or sucking bottle.* The former has the advantage of leaving less opportunity for uncleanliness, as a spoon is easily washed, and its condition at once perceptible; while the bottle may appear clean, and yet contain a leaven of acidity, which will do material injury. On the other hand, the bottle has the advantage of giving out the food in a mode somewhat analogous to that employed by nature; with it the child has some trouble in procuring what it wants, and will therefore not be likely to take too much; the action of sucking must also be practised, whereby a degree of pressure is made upon the child's salivary glands, and the necessary secretion from these organs, in all probability, usefully promoted. In the earlier periods, we think, the bottle possesses, in these respects, decided advantages; but while using it, too much precaution cannot be taken to secure cleanliness. No food should ever be allowed to remain in it after the infant has been fed; and there should always be two bottles in the nursery, in order that one may be exposed to the air, and dried, while the other is in use.†

VI.—WEANING.

The time of weaning, we have already intimated, should be that indicated by nature, (that is to say, between the seventh and twelfth months in ordinary cases,) when by providing the child with teeth, she furnishes it with the means of obtaining nourishment from substances of a somewhat solid form. The mode of weaning may be easily deduced from the rules which we have laid down for the feeding of the infant. If it has been gradually accustomed to a diminished supply of maternal food, weaning will be an easy process, and a great deal of suffering will be spared both to parent and child. No violent change should be made; and by proceeding gradually, the infant will come to prefer artificial food contemporaneously with the failure of the maternal supply. This is what the term weaning imports, and this is the mode in which it should be accomplished.

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* These bottles have narrow necks, about the size of the nipple, with a small orifice, covered with a teat of washed shammy leather, through which the infant sucks the food. They can be had at any druggist's, ready for use.

† Dr. Zwierlein, of Brückenau, has written a book to prove that goats are the best and cheapest wet nurses. We fear it would be difficult to introduce the practice into this country.—*Die Ziege als beste u. wohlfeilste Saügamme*, 1816, *2r theil*, 1819.

VII.—FOOD IN THE SECOND PERIOD.

For some time after weaning, the child's food should consist of those materials which we have mentioned as proper during the latter months of suckling. Regularity in the times of feeding, is probably of nearly as much importance as the quality of the food itself. No definite rules, however, can be laid down, as to particular hours, as much must be dependent upon the habits of the child, and of its guardians, as to sleep, &c.; but the general principles should, under all circumstances, be observed, of permitting no variation, from day to day, in the times for the different meals, and of not breaking in upon these by giving food at irregular periods; while, at the same time, protracted fasting must not be allowed. During the day-time, about four hours is quite sufficient interval between any two meals: this will give time enough, in children, for the stomach, and commencement of the small intestines, to perform their offices in the process of digestion, and allow the former an opportunity of recovering energy after the discharge of its function.* It is better not to allow a child to acquire the habit of being fed during the night, as uninterrupted sleep is what they then most require; to ensure which, it is necessary that the stomach should be in a state of comparative rest. Perhaps, the best mode in which we can illustrate our ideas with respect to the plan upon which a child should be fed, will be, to describe specifically a day's feeding of a healthy child,—premising that we do not mean to enforce a literal observance, in all cases, of the particulars specified, but merely to give an example of the working of the principles we have laid down.

A healthy child, of two or three years old, commonly awakes hungry and thirsty, at five or six o'clock in the morning; sometimes even earlier. Immediately after awaking, a little bread and sweet milk should be given to it, or (when the child is too young to eat bread) a little bread pap. The latter should be warm; but in the former case, the bread may be eaten from the hand, and the milk allowed to be drunk cold, as it is as well, at this meal to furnish no inducement for eating, beyond that of hunger. After eating, the child will generally sleep again for an hour or two; and about nine o'clock, it should get its second meal, of bread softened in hot water, which latter is to be drained off, and fresh milk, and a little sugar, added to the bread. Between one and two, the child may have dinner, consisting, at the younger ages, of beef, mutton, or chicken broth (deprived of all fat) and bread. When a sufficient number of teeth are developed to admit of chewing being performed, a little animal food, as chicken, roast or boiled mutton, or beef, not too much dressed, should be allowed with potato or bread, and some fresh, well-dressed vegetable, as turnips or cauliflower. After dinner some drink will be requisite; and a healthy child requires, or indeed wishes for, nothing but water. Light, fresh table beer, would not be injurious to a child of four or five years old; but it is unnecessary, and no advantage would, in this instance, result from the creation of a new want. Between six and seven o'clock, the child may have its last meal, of bread steeped in water, as at nine o'clock in the morning. A healthy child, who has been in the open air during the greater part of the day, will be ready for bed shortly after this last mentioned supply, and will require nothing more until next morning. Similar regimen and hours may be adopted throughout the whole period of childhood; only, as the fourth or fifth year approaches, giving, for breakfast and supper, bread and milk, without water, and either warm or cold, according to the weather or the child's inclination. The supply of food, upon first awaking in the morning, may also be gradually discontinued, and breakfast given somewhat earlier.

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* The importance of not setting the stomach to work during the latter stages of digestion, is well put by Dr. Paris, in his able article on Dietetics, in the Cyc. of Pract. Med. The maxim should be carefully attended to in feeding children.

The foregoing, we conceive, may fairly be offered as a model of a suitable diet for children; but, as Dr. Barlow* judiciously observes, "No exclusive system can be right, nor can any precise rule of diet be possibly laid down, as this requires to be adapted, in every case, to the particular constitution concerned." With the stomach of one child, for example, so much milk as we have recommended may disagree, and produce acidity, and it may be advisable to substitute for it tea or cocoa; with another, a meat dinner every day may produce plethora, and it may be necessary to alternate it with rice, or some other vegetable substance. The constitution of the child, its habits of exposure to the air, and its residence in a city or the country, must be taken into account; and something must also be allowed for the customs of the community in which it is brought up.

A judicious parent or physician will recollect all these matters; and while, as we hope, they will be able to derive something like a foundation of principles, from our recommendations, they will yet recognize the expediency of occasional modifications in matters of detail. It is of great importance, that no preconceived system or theory, with respect to diet, should be assumed and adhered to, with unreflecting obstinacy, as is but too often the case. Thus one class of persons, urging that the growth of a child requires an active nutrition, adopt the theory that an excess in the quantity or quality of nutritious matter supplied cannot be committed. Such theorists are apt, by cramming and overloading the stomach, to cause the digestive powers to be impaired to such an extent as will prevent the food from being converted into nutriment, and so to produce the defect in supply of new material which it is their object to avoid. Others, observing a healthy remnant of potato-fed children in an Irish cabin, and hearing that the Hindoos live and thrive upon rice, forthwith infer that scanty vegetable food is the true panacea for health and longevity; and accordingly, condemn their offspring or patients to the miseries and perils of an insufficient, non-animal diet. Most unfounded prejudices are also taken up from *ex-parte* observations as to the wholesomeness or unwholesomeness of individual articles of food. Fruits, for instance, are under a general interdict from the dietary of children; and the consequence is, that the school-boy, impelled by his instinct* on the one hand, and restrained by his managers on the other, devours, in secret, and often to his great injury, the unripe, ill-cultivated, and pernicious trash of the fruit-stall, instead of moderately using, as he should be permitted to do, such wholesome, cooling, and antiseptic fruit as the season may afford. Much learned trifling has also escaped from writers with respect to the propriety and necessity of "living *naturally*, and on such food as is presented to us by nature:" and we are often told that children should be fed upon bread and milk alone; because the former is prepared by the simplest cookery, and the latter in what they call the laboratory of nature. Dr. Fordyce, however, has met the question, and settled it at once, by declaring that "man has no natural food." Let those who may be startled by this proposition call to their recollection the difference between the milk afforded by a cow kept alive by the weeds and scanty vegetation of a neglected common, and one fed upon the riches of a pasture which has experienced the transforming power of cultivation; let them recollect that the wheat, of which their so-called natural diet is composed, is itself the result of a long course of cultivation, and a full employment of all the resources of the complicated art of agriculture. "The potato," says Dr. Paris, among many other examples,—"whose introduction has added so many millions to our population, derives its origin from a small and bitter root which grows wild in Chili, and at Monte Video."*

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* See his excellent article on Physical Education, in the Cyc. Pract. Med.

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* We have the authority of Dr. Paris for the fact, "that artisans and laborers, in the confined manufactories of large towns, suffer prodigiously in their health, whenever a failure occurs in the crops of common fruits. This fact was remarkably striking in the years 1804 and 1805."—*Art. Dietetics, in Cyc. Prac. Med.*

The science of Dietetics is, in truth, an uncertain one; any facts that we know respecting it, being liable to be influenced by many varying conditions, all of which should be taken into the consideration of every individual case; and after all, no theory should be allowed the slightest weight in a particular instance in which it may be contradicted by experience. If an article of food, in favor of whose wholesomeness we have universal testimony, should disagree with a certain individual, its use with that person must not be insisted upon.†

VIII.—CLEANLINESS.

The importance of the excretion from the skin is universally acknowledged, and is sufficiently proved by the amount of the daily perspiration, which was estimated by Lavoisier and Seguin at an average of 1 lb. 14 oz. in the adult.‡ The discharge being natural and essential for the preservation of health, the necessity of removing from the body of the child, any obstructions to it which might be offered by the adhesion of extraneous matters, must be sufficiently obvious. The beneficial action of the physical agents upon the system, (of which we shall again speak,) as these agents must act through the medium of the skin, leads us to infer a similar necessity. The accumulation of impurities upon the surface will also be observed to produce very distressing excoriations, and even permanent cutaneous diseases, which, when once established, are often with difficulty removed. With these considerations in view, we therefore feel authorised to advance the dogma, that too much attention cannot be paid to the subject of cleanliness, during both periods of childhood.

The infant's body, we have already stated, requires to be carefully washed immediately after birth; and the same operation should be performed daily, until the child becomes old enough to attend to its own comforts. Washing should at first be performed with warm water and a fine sponge,—taking care, in the early periods, that no exposure be permitted long enough to produce an impression of cold. As the infant grows stronger, and when the weather is warm, we may gradually lessen the temperature of the water, until at length it may be used nearly quite cold. It is better, however, for the reasons assigned in p. 47, to be in no hurry about employing a perfectly cold bath; and under any circumstances, we would not recommend water to be used without allowing it to remain in the nursery, during the night, in order that it may so acquire a slight increase of temperature. It is not necessary to use soap, except with parts of the body (as the hands and arms) which are particularly exposed to the reception of impurities; even with these it should only occasionally be employed. Brown soap is better than white, as being less likely to cause cracking of the skin, which is often a source of much annoyance to the child. In all cases, great care should be taken to dry the surface well with a soft napkin, especially where there are folds of the skin, as between the nates, on the front of the neck, arm-pits, &c. A neglect of this precaution will be sure to occasion excoriation, and often troublesome sores. To make matters more secure, we shall do well in fat children, after careful drying, to dust the skin, in such situations, with some fine dry powder, as hair powder, or starch finely levigated and sifted through a muslin bag. This will absorb the secretions from the surface, and prevent friction.

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* Op. Citat.

† Some very unexpected facts and opinions with regard to the nutritive properties of various kinds of food have been lately brought forward in the Report of the *Commission on Gelatine*, to the Academy of Sciences of Paris. A translation of this remarkable document, in the preparation of which, M.M. Thenard, Dumas, Flourens, Serres, Breschet, and Magendie, were engaged during ten years, will be found in the *Medical Press*, vol. vi. p. 129, and will well repay the trouble of perusal. [Note to 4th Edition.]

‡ Lavoisier's Traité Elementaire de Chimie.

While washing the infant, during the first few days of its life, attention must be paid to the condition of the navel string. The linen in which we envelope this part immediately after birth usually adheres firmly to it; and if it remains dry, we need not disturb it, but merely raise it gently, so as to admit of the abdomen underneath being carefully washed and dried. In ordinary cases, the cord dries up and falls off between the sixth and tenth days, ulceration taking place at the navel. A small healthy sore remains for a few days longer, which will commonly heal up without requiring any interference, except the daily application of a piece of dry, old linen.

The frequency of the discharges from the bowels and bladder of an infant, requires us to enforce especial care in changing the napkin placed for the reception of those matters—otherwise the skin will be injured, and disagreeable excoriations produced. We are to recollect, that, in the natural state, these evacuations are regularly periodical; and an observant nurse will soon discover the periods when they are about to take place, and not only anticipate them, but teach the child, at a very early age, to give intelligible warning of its necessities: the complaint is often made to us of a child's being dirty, but it may be relied upon that the fault is almost always with the nurse. Indeed, we have no doubt that an orderly education of these functions, commenced in the earliest infancy, will be the means of establishing a regularity of the bowels which will continue throughout the whole of life,—and the more tenaciously, because in such training we are not altering or improving nature, but merely working in unison with her tendency to periodicity. As the child advances, we must continue an unabated attention to cleanliness; the hair must be carefully combed and brushed; and the ears, eyes, and all other openings of passages from the interior of the body, must be kept perfectly clean, as well as the skin itself. By adopting such a line of conduct, we may count upon almost certainly preventing eruptions, upon the scalp or skin, unless directly communicated by contagion, and of materially diminishing any tendency, that may exist, to scrofula, marasmus, or rickets.

Mere washing will, of course, have little effect, if scrupulous exactness be not observed in making frequent changes of the child's clothes: an infant or young child should have a complete change of dress every day; and the linen of elder children should be changed very frequently,—so often as to prevent the accumulation of any impurity.

IX.—CLOTHING.

We have already dwelt, at sufficient length, upon the principles which should guide us in the clothing of an infant immediately after birth. They are simply; to preserve a sufficient quantity of heat, and to do so without setting any restrictions upon the free movements of all parts of the child's body and limbs; or irritating its tender skin. Although the discoveries of Dr. Edwards, to which we have referred at the commencement of this chapter, lead directly to the establishment of the first principle now laid down, yet the subject is one of such great importance, and so much mystified by the phantasies of systematic writers, that we shall make no apology for the following long quotation. "It (mortality from cold) is not confined to children whom the misery of their parents cannot guard from the rigor of the weather, but it operates to a great extent, without being either perceived or suspected, in families enjoying affluence, and in which it is believed that the necessary precautions are taken,—because, cold being relative, it is difficult from our feelings to judge of its effects on others, and because it does not always manifest itself by determinate and uniform sensations. They do not feel the cold, but they have an uneasiness or an indisposition which arises from it; their constitution becomes deteriorated by passing through the alternations of health and disease, and they sink under the action of an unknown cause. It is more likely to be unknown, because the injurious effects of cold do not always manifest themselves during or immediately after its application. The changes are at first insensible; they increase by the repetition of the impression, or by its long duration; and the constitution is altered without the effect being suspected."*

We wish we could, as a commentary upon the foregoing passages, adequately depict one of those miserable victims of parental vanity, whose appearance in our streets will sometimes, upon a March or November day, strike cold into our hearts. The cap and feathers set upon, not covering, the child's head, and probably of a color and richness contrasting mournfully with the blue ears, sharpened nose, and shrunken cheeks, in which cold has assumed the features of starvation—the short kilt and Highland hose, exposing between them, cracked and quivering knees—altogether require for their description more graphic power than we presume to lay claim to. We hope, however, that we have said enough to call attention to the absurdity of the "hardening" system, as it is called, and to show that the adoption of a clothing, regulated so as to obviate the rigors of our climate, is both demanded by our sensations and sanctioned by our knowledge.

The material of clothing is not, we conceive, of very great consequence. We are rather inclined to discourage the use of flannel, next the skin, in young children; it is liable to injure the tender and irritable surface, and it is more likely than linen to permit the concealed accumulation of dirt. For these reasons, and as children need not be exposed to wet, we think flannel next the skin had better be avoided. The feet should be protected in winter, by warm stockings, and sufficiently strong shoes; and when the weather is particularly cold, woollen gaiters should be drawn over the legs, when the child is about to be exposed to the air. It has latterly been a good deal the fashion to allow children, when a little advanced, to sleep without night caps; and this we think, may be permitted with advantage, as the tendency to morbid excitement of the brain, which is so marked a characteristic of childhood, makes it desirable that the circulation through that organ should be preserved in as tranquil a state as possible; which can be most effectually done by keeping the head cool. The non-confinement of the hair will also promote its growth, and in this instance we may very safely leave nature to herself.

In every article of dress the principle should be carefully followed, of placing no constraint upon the motions of any part. For the boy, tight-waisted trowsers, or braces; and for girls, stays and corsets of all kinds, must be forbidden during the whole period of childhood. The injuries that may be committed upon the organs in the chest and abdomen, by the latter article, are well known to be of the most serious nature; the chest may be completely altered in shape, and the lungs diminished in their capacity by a continued pressure so applied; while, at the same time, the stomach and liver are driven from their natural position, and made to press upon the other organs of the abdomen. Derangements of the functions of respiration, circulation, and digestion, follow as natural consequences, and but too often lead to an early grave, or, what is perhaps worse, to a life of prolonged delicacy and ill-health. After all these risks, the object held in view in the use of stays is not attainable by their means. By active and continued compression upon the lower part of the chest, its shape may no doubt be altered,—the ribs may be brought together, so as to form a narrower circle, and a shape be produced which however it may be fancied to approach the ideal of beauty, yet bears no resemblance to the human form, either as it comes from the hands of nature, or exists in the conception of the artist. The only way in which we can assist in the production of a really fine figure is, to remove all restrictions, and secure, as far as possible, so free an action of the muscles as will lead to their perfect development. By such a course, also, we shall best promote the acquirement of a good carriage, which is infinitely more likely to be the result of a perfect balance of the muscles, than of any mechanical support whatsoever.

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* Edwards, op. citat.

If the principle of avoiding constraint were to be held in view, in the management of a child's feet, much suffering would be spared in after life. Corns and tumours upon the toes are almost always the results of tight, or ill-fitting shoes; and therefore it is highly desirable, that we should have these articles so constructed as to protect the foot equally, and not to injure it by any undue pressure upon particular parts.

X.—SLEEP.

For several weeks after birth, the infant is disposed to sleep continuously, only awakened when pressed by the demands of hunger; and it should certainly be our object not to disturb its repose. As its senses become more capable of bearing external impressions; and probably as its sensorium begins to elaborate these latter into ideas, the waking interval becomes gradually longer, and after some time, the chief portion of sleep is taken during the night. Throughout the whole period of childhood, however, more sleep is required than in adult age; and up to the third or fourth year, the child will be disposed, and ought to be allowed, to sleep for an hour or two during the day-time.

In regulating the periods for sleep, as in other matters, we should not forget the periodical plan almost universally adopted by nature; and by a little training, or rather by permitting that plan to operate without disturbance, the nurse will be saved many a sleepless night. Matters should be arranged in the nursery, so as that no obstacle shall be opposed to the child's sleeping, about the middle of the day, an hour or two before its time of dinner; it will thus be again sufficiently tired, in the evening, to ensure its sleeping soundly from seven or eight o'clock, until the following morning. On the other hand, if we defer its mid-day rest, to a late hour of the day, its night's sleep will not commence so early, and (the child being less fatigued) it will probably be interrupted before morning.

A question is often put to a physician: should the child sleep with its mother or nurse? For a month or two after birth, it is unquestionably desirable that it should; for the infant, as we have seen, possessing a low temperature, and but a small power of generating heat, requires to be kept warm by contact with another being. In support of this conclusion, we may allude to the care which is taken by birds and other warm-blooded animals, to preserve heat in their young offspring by the almost continual application of their own bodies. In our care for the infant, however, we must not forget the mother: and as her health would be likely to suffer from the anxiety and disturbance occasioned by being obliged to attend to a child during the night, we need not prolong unnecessarily the period of its sleeping with her. At the expiration of a month or six weeks, especially when the weather is warm, the infant, if healthy, will, with due precautions, be able to maintain its own heat, and we may then allow it to sleep in a cradle or bed by itself. A sufficiency of bed-clothes should be used, and the temperature of the room, during the first few months, should not be allowed to fall below 60° F. While we are anxious to keep the young being warm, we must be equally careful to permit a free access of pure air to its mouth, which should also be strictly attended to while it sleeps with the mother or nurse.

In placing the child in a cradle or bed by itself, care should be taken to lay it upon its side, as that is the position in which it naturally lies upon the arm of the nurse; and the flowing of the saliva and other matters from the mouth is thus facilitated.

There has been, at all times, a considerable expenditure of words, and much learned trifling, with regard to the question of the salubrity or insalubrity of cradles. It appears to us that their employment, or non-employment, is a matter that may very safely be left to the fancy or convenience of the parents. A cradle makes a clean, airy, and, from the facility of moving it about, a convenient bed, and, as such, has advantages over more ponderous pieces of furniture. As to the injury likely to be inflicted upon the cerebral system, by rocking, we have not the shadow of a proof, that such a species of motion is ever injurious to the brain, either of infants or adults; if it were so, how would the sensorium of the infant escape the effects of the thousand shocks to which it is exposed, and that too in an inverted position, before birth; or, among adults, what sort of brains would the veteran sailor possess? Throughout all our views respecting the management of children, we wish to avoid speculating or dogmatising in the absence of any basis of facts, and to lean to popular opinions, (whose antiquity, we are not ashamed to confess, is in our minds, primâ facie evidence of their having originated in accurate observation,) rather than to affect a pretension to science by abusing, upon a theory, practices which possess the sanction of long and general use. We cannot, therefore, agree that "rocking must be utterly disallowed," or that the reason for its disallowance, viz. that: "Sleep here ensues, because the motion promotes a congestive state of the vessels of the brain, inducing a degree of vertigo "[*]—is any thing more than a very shadowy hypothesis.

During the whole of the second period, a child should, decidedly, sleep alone, in a bed without any hangings which might impede the free access of air, and in a room as large,[†] as can conveniently be procured; not cold, or admitting draughts of wind, but provided with the means of free ventilation. As few persons as possible should be allowed to sleep in the nursery, and in winter a fire is an essential requisite, both for the preservation of a sufficient temperature, which should be permitted to fall as little below 60° F. as possible; and also for the promotion of a free circulation of air.

With respect to early rising, we are ready to admit, to the fullest extent, the great advantages, physical and moral, of the habit, but still we must protest against a child being, under any circumstances, curtailed of its due proportion of sleep. The way to promote early rising, safely and usefully, is to train the child to habits of retiring early to bed, and to encourage it to rise immediately upon its spontaneous awaking, but by no means to force it from its bed before the latter occurrence. No definite rules can or ought to be laid down as to the number of hours' sleep to be allowed: one child may require more or less than another; and our only safe guide will be, to train it to go to bed shortly after its last meal in the evening, and then permit it to sleep, without disturbance, until it awakes, of its own accord, upon the following morning.

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[*] Cyc Pract. Med. art. Physical Education.

[†] According to Dr. Edwards' view, the advantages of large rooms are not merely to be referred to the greater purity of the air: he thinks also that the slight agitation of the atmosphere, caused by the space being extended, produces such a feeling of well-being, that the chest dilates in consequence, and admits a large portion of air. The agreeable sensation which is experienced on breathing in the country is, he says, principally due to that cause. Henke refers short sightedness to the narrow circle of vision rendered customary in confined nurseries.—*Adolphe Henke Handbuch der Kinderkrankheiten. Fkt. a M.* 1813.

The composition of the infant's or child's bed, is a matter of some moment—it should be firm and elastic, and of such material as can readily be dried, or altogether changed when wet. To answer these ends, a small tick, stuffed with straw, forms the best bed for the infant and young child; the straw should be frequently changed, and the tick as often washed, and well exposed to the air. For a more advanced child, a hair mattrass answers all purposes. It should be exposed daily to a draught of air; and in summer, placed for an hour or two in the sunshine, when that is practicable.

XI.—EXERCISE.

From the earliest periods of infancy, some degree of muscular motion is necessary for the well-being of the child; and as Dr. Barlow judiciously observes, "it is advisable to suffer them to exercise their limbs freely, by laying them frequently on a bed, sofa, or carpet, and allowing them to roll and kick at their good pleasure." This, and being carried about in the nurse's arms, is all the exercise a mere infant requires.*

In handling and carrying the young infant, the nurse should never forget the delicate and feeble organization of its bones and muscles, which are altogether unfit to sustain any weight or pressure. During the first four or five months it should never be placed in a sitting posture, and when it is carried about, the head should always be supported upon the arm or breast of its bearer. In lifting an infant also, the arms should never be laid hold of; and care should always be taken to make no undue pressure upon the chest, the shape of which may, by a neglect of this precaution, be permanently altered. It may be well here to advert to a similar hazard noticed by Dr. Barlow, as likely to attend the practice of *hoisting*, as it is termed; by the hand of the person holding the child being placed with the thumb and fingers on each side of the breastbone. Hoisting should not be practised with an infant under six or seven months old; but even at that age, it appears to us extremely probable that some impression may be made upon its chest in the manner referred to, and we should therefore caution the nurse against allowing it to be so grasped. The act of hoisting, itself, appears to be always attended with pleasure to a healthy child; probably in consequence of that sense of well-being which we have already noticed as being produced by agitation of the atmosphere; and provided it be practised with care, that no risk of a fall be incurred, and the child be old enough to bear it, it need not be interdicted.

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* Nurses are in the habit of rubbing the infant's body gently with their hands, during the time of dressing. This friction appears to be agreeable to the child, and is probably useful, by stimulating the surface, and promoting the cutaneous circulation. It may be considered as a species of exercise.

With respect to the period of the child's walking, we conceive that its commencement should be left entirely to nature. Spontaneous efforts will never be made to an extent likely to produce injury; but go-carts, &c., should be banished from the nursery, as by such contrivances, the child will be supported and induced, prematurely, to walk, before its limbs have acquired sufficient firmness to enable them to support the weight of the body. By these attempts at anticipating the child's strength, its legs may be made crooked, or a still worse effect may be produced in female children by causing distortion of the bones of the pelvis, the evil consequences of which may be first discovered when the child herself is about to become a mother: such results, however, are scarcely to be dreaded when the commencement of walking is a voluntary act. As soon as the child is able to support itself in a sitting posture, that is from the eighth to the twelfth month, it should be occasionally placed upon a carpet, with some play-things spread about it. Towards these it will soon endeavor to creep, and after some time when its locomotive muscles have acquired greater strength, attempts will be made to assume the erect posture and ultimately to walk alone.

In early childhood, the taking of exercise may in like manner be left altogether to nature; all we have to do is to provide opportunity, by allowing the free and unrestrained use of a garden or field, in fine weather; or of a large nursery at other times. The active and restless spirits of the child will then prompt it to do all that is required for its health, and its own sense of fatigue will be the best monitor as to the proper duration of its exertions.

When the child grows into the boy or girl, more consideration becomes due to the management of its muscular system, as the necessity for dedicating definite portions of time to mental education then, first, arises. It then becomes an object to economise the hours of exercise, and for this purpose the gymnasium and dancing-school are sought by parents and recommended by physicians. The latter is generally considered rather as a place for acquiring an accomplishment than for exercise; but under a judicious master, who avoids constrained positions and restrictive machinery, dancing may do excellent service, by giving vent to the buoyant spirits of youth, and exercising almost all the muscles. The gymnasium has certainly been an improvement in modern education, but it, too, has its evils and hazards. In it also a skilful teacher is required, whose knowledge of muscular anatomy will enable him to contrive means of generally exercising the frame, and whose judgment will constantly interfere to prevent the young from being carried on by spirit and emulation to an overtaxing of their own powers. When practised to too great an extent, gymnastic exercises certainly stop the growth,* by directing all the energy of the individual towards a development of the muscular system: if improperly directed, they may also occasion ruptures, and injuries to the joints; but under a skilful teacher, such abuses may be certainly and safely prevented. Neither gymnastics nor dancing ought, however, to supersede the daily play in the green fields, and both parents and children are fortunate, when not forced by circumstances to sacrifice this, the most healthful and most invigorating of exercises.

Our plan, (restricting our observations to the management of childhood,) does not warrant us in considering at any greater length the exercises of youth,—a full view of the merits and peculiarities of the different kinds of which belong more to the province of the physiologist, than of the child's physician. With respect to the quantity of exercise to be permitted to the child, we can give no rules more definite, than to allow the dictate of nature to be followed when fatigue is experienced, and rest called for, and to adopt the views already put forward as to the proper periods for sleep and food; by carefully attending to these latter, regular interruptions to play or continuance in the open air, will, of course, be provided for, and that to an extent adequate to the wants of the individual.

It is much to be desired that public gardens should be established in our large towns, to which the inhabitants, of all classes, and their children, could have access. They should be planted with shrubs and trees, so as to afford moderate shelter, and be provided with a large shed, in which refuge might be taken from the vicissitudes of our variable climate. Most, large, continental towns have a provision of this kind, as well as numerous private gardens, to which the poorest can resort at no greater expense than the price of a cup of coffee. We know it will be objected, that in our country such places would become scenes of drunkenness and riot; but we are sanguine enough to hope, that the opportunity of enjoying temperate amusements in the presence of their fellow-citizens, of a better rank, would be

* Any person who recollects the stunted stature of a boy, servant in a gymnasium in this city, will admit the truth of the above statement. We are happy in being able to corroborate our, somewhat heterodox, notions, respecting the *abuse* of gymnastic exercises, by the authority of Dr. James Johnson. He, also, very correctly, points out their tendency to call into activity diseases of the heart and great vessels, in young individuals previously predisposed to those affections.—Vide *Economy of Health*. London. 1837.

appreciated by our artisans, and ultimately tend to restrain their ferocity, and elevate them in their own opinions. The lower classes, of these countries, are too much thrown upon the one brutal indulgence of drinking; and it is an absurdity to suppose that the strictest revenue laws will have any effect, except to aggravate the evil. Make spirits dearer, and the laborer will certainly diminish his allowance of food and clothing to procure the only means within his reach, of relieving his mind from the pressure of toil and want. Give him an opportunity of being amused, when his day's labor is ended, with music; and of enjoying the pleasures of a public garden, in the presence of his superiors, and we hope (perhaps too sanguinely) that he will be gradually led to lessen his allowance of spirits, in order to enable him to procure dress sufficiently decent to admit of his partaking in these amusements, without a sense of degradation.

XII.—MEDICINE.

There is no subject connected with the management of children, in which such fatal errors have prevailed, as the treatment of their bowels; and unfortunately, the influence of certain medical theories has, of late years, tended rather to the increase than diminution of those mistakes. The importance which has, in many respects very justly, been attached to the condition of the digestive system in disease, has attracted much attention to its state in health. Unhappily, however, the great majority of persons fall into the grievous fallacy of supposing that what is useful as a remedy, must also be useful as a preventative; and as the multitude have, in the case of the system in question, but one idea cognate with either remedy or preventative, viz., the idea of purging, the propriety of adopting a regular system of purgation with healthy children, has been admitted, almost without question. There cannot, however, be a more dangerous absurdity than such a system; and in proof of our opinion, we shall ask a single question, and bring forward a single fact. What is the mode of action, and effect of every aperient drug in the pharmacopœia—Is it not irritation, direct or indirect, of the intestinal mucous membrane, in a greater or lesser degree; and does it not produce, as a necessary effect, in every instance, a larger or smaller quantity of increased secretion? So much for our question. We presume that, except among the disciples of St. John Long, no person will be found to maintain that irritation producing increase of secretion, can ever be necessary in a healthy body. With respect to our fact—let any person with regular, or moderately regular bowels, take an aperient, and he will certainly find that after its immediate effects have passed away, a state of costiveness will be the consequence. All the operations of nature are characterised by a tendency to periodicity, and whenever the regular periodical action, which she has ordained for the digestive canal, is interrupted by the production of evacuations, at irregular periods, she will require some time to enable her to recur to the simplicity of her original design. This is the true theory of the constipating after-effect of purgatives.

We wish it to be distinctly understood, that what we are now advancing has no reference to the *use* of purgatives in disease, but solely to their *abuse* during health; and we are the more particular in endeavoring to convey our own views upon the subject, because we know that the impropriety of a needless resort to medicines of this kind, is not sufficiently thought of by medical men. We have, indeed, too often had occasion to lament over the display of drugs upon the mantel-piece of a medical man's nursery, not to feel special interest in this matter. The least judicious would surely grieve, did he see an ointment of cantharides rubbed upon a healthy skin with no other apparent intention than that it might be followed by a healing salve; yet, what, less absurd, is portended by the accumulation, in such a situation as we have alluded to, of packets of aperient draughts, bundles of restraining powders, and bottles of carminative mixture—all designed for the same unlucky children. This is no imaginary description, we have, but too often, seen its original; yet, better and more merciful would it be, towards many of the victims, to destroy them in the birth, than, by such a course, to provide for them the enduring, moral and physical miseries of an irritable mucous membrane.

The bowels of a healthy infant, after the meconium has passed away, should be opened from two to four times in the twenty-four hours. The discharge should be fluid, of a lightish-yellow color, free from fetid or acid smell, and destitute of lumps, or white curdy matter: it should pass without pain, or any considerable quantity of wind. As long as these conditions exist, there is no occasion for medicine; should they be, materially, deviated from, a state of disease must be present, and will be indicated by other symptoms, the nature and treatment of which shall be considered in the proper place. The infant may, however, labor under a degree of costiveness which can scarcely be called a disease, and may yet require medical interference. Having less than two stools, for example, in the twenty-four hours, calls for an aperient; and so also does a lumpy, or partially solid, condition of the discharge. The medicine, in such cases, should be of the mildest nature. For an infant, from half a drachm to a drachm of fresh castor oil, will generally answer every purpose; or a dessert spoonful of a mixture, formed of a couple of drachms of manna dissolved in an ounce of fennel or carraway water, may be given, and repeated every hour until the bowels are opened. These are probably the only safe nursery medicines. Calomel, which is but too commonly the first article on the list, should be banished from it altogether, and never given for the mere removal of, what we may perhaps call, healthy costiveness. Its use seldom fails to produce motions of a green color, mixed with gelatinous mucus; thereby showing that it is likely to do much more than we want, when our object is merely to empty the bowels of their contents.

During childhood, the bowels should be regularly freed once or twice a day (some difference existing in individuals as to the precise number of their periodical motions.) The discharge should be of a rather darker yellow than in the infant, and more solid, but less so than in the adult; it should have a feculent smell, and be free from mucus, or lumps of indigested matter. When a healthy child has been treated upon the principles which we have indicated,—under the heads of food, exercise, and cleanliness,—it will seldom require any purgative medicine; but occasionally, from some error of diet, or other accidental circumstance, costiveness will occur, and we must then be prepared to recommend a mild aperient. A couple of drachms of castor oil will usually answer very well; or, if that should disagree with the stomach, a table-spoonful of the mixture directed below, may be given every second or third hour, until it operates.* In childhood, as in infancy, the domestic use of calomel cannot be too strongly interdicted.

XIII.—LIGHT.

The influence of this physical agent in the vegetable kingdom, is known to every one who has observed the bleached appearance of a plant growing in the dark, or has noticed the efforts made by flowers, placed near a window, to turn towards the light, even though they may not be exposed to the direct action of the solar rays. It can scarcely be doubted that similar effects are produced upon animals, and Dr. Edwards has made some ingenious experiments to show the influence of light upon their development. In the course of his researches, he found that those imperfect animals which naturally change their form, as tadpoles, were prevented from doing so by the withdrawal of light. In man it is not easy to obtain any information as to the specific effect of light unaided by air and heat; but from the facts just alluded to, we are warranted in inferring analogically that light must materially influence the development of form. The infant, therefore, as soon as its eyes lose their extreme sensibility, should be freely exposed to light. The nursery should never be darkened during the day; and at night, it is better that the shutters should be left unclosed, and no window curtains used.

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* Take,
Of Compound Infusion of Senna, four ounces,
Carraway Water, two ounces,
Tartrate of Potash, two drachms,
Manna, one drachm.
Mix.

XIV.—AIR.

We hope the stress which we have laid upon the propriety of keeping up a due degree of warmth in the nursery, will not be interpreted as warranting any measure likely to interfere with a free access of air. Both objects are perfectly compatible. The purity of the air in which the child resides and sleeps should be secured, by providing means of ventilation, in a sufficient number of windows and a chimney, which latter is absolutely essential to the establishment of a current of air; and also by restricting the number of individuals residing in the apartment, within the narrowest possible limits. It has been already stated that a certain agitation in the atmosphere is healthful; and, therefore, the nursery should be as large as possible, in order to favor motion of the air contained within it.* But our attentions with regard to air, should not be confined to the nursery; the vivifying influence which it has been shown to produce upon the system, by contact with the surface of the body, furnishes us with an explanation of the advantageous results which experience shows to be derivable from an exposure of the child to the open air as freely as possible, consistently with an observance of the principles already inculcated under other heads. It is this vivifying influence which renders the play in the open fields so much more useful than the most carefully directed exercises of the gymnasium.

XV.—HEAT.

We have already incidentally said so much upon this subject, that any thing more would be merely repetition. We may, however, take the opportunity of controverting a very common fallacy, viz., that exposure to heat renders the body more susceptible of the ill effects of cold. Dr. Edwards found, that "in exposing animals to successive applications of cold, their temperature will fall the more slowly, the longer they shall have been subjected to the influence of warmth. Hence, that those who are liable to frequent exposure to severe cold, are rendered more capable of supporting it, by subjecting themselves, in the intervals, to a high temperature." We find, in point of fact, that the Russians, and other northern nations, preserve, by means of stoves and double doors and windows, a very high temperature in their dwellings during winter, and yet leave them with impunity to pursue their occupations in the open air.[*] This should make us hesitate in denying access to a fire, to a cold and shivering child, under the idea that we shall render him, by the prohibition, hardier, and less likely in future to suffer from cold.

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* Mr. Carmichael, in his admirable lectures on Scrofula, published in the 3d Vol. of the *Medical Press*, deprecates the practice, common in these countries, of placing nurseries in the attic stories of houses, where they must of necessity be recipients of all the foul air generated in the apartments beneath. The caution is well worthy of being attended to. [Note to 3d Edition.]

CHAPTER IV.

MENTAL AND MORAL EDUCATION.

The connection between mental and moral education, and the physical management of children, is so close, and the action and re-action of the one upon the other so constant and influential, that an essay upon the latter would be incomplete, indeed, almost useless, without some notice of the former subject. In turning our attention, however, to this most important of human concerns, we feel considerable embarrassment, both from the difficulties incidental to the subject, and from the narrowness of the limits within which the nature of the present plan obliges us to confine our observations; at the utmost we can deal but in generalities, and even with these only in the briefest manner.

In the foregoing chapter we commenced our consideration of physical education, by supposing an infant to be placed in our hands immediately upon its entrance into the world. We found it naked and helpless, in fact a mere vegetative being, with its organs of nutritive life fitted, and ready to act, but altogether dependent upon the care of others for such a supply of material for these organs to work upon as was absolutely necessary to preserve its existence. Pursuing the subject, we endeavored to investigate the nature of the various physical wants of the child, and to point out the principles which should guide us in administering to and supplying them. We are now in a precisely similar position with regard to the moral and intellectual system of the young being—it is placed in our hands fresh from nature, and we are called upon to make a like investigation into the wants of the system in question, and to consider, in like manner, the principles upon which we can most safely and prudently obviate or regulate them.

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[*] The common winter temperature of houses in St. Petersburgh, is 64° F., while out of doors, it is frequently so low as 20°.—*Dr. Granville's Travels*.

The progressive development of the various intellectual powers in the child has been already alluded to in the first chapter, and to the course of this development we must look for our only natural guide in all attempts to educate these powers. The infant at birth, we have seen, (p. 34,) possesses little capability of perception; some of its senses are still imperfect, and all are, from want of training, unfitted to convey correct information to the mind; the memory is yet unfurnished with facts; and the whole system is, as it were, a machine in some degree ready for work, but from which the moving power is still withheld. Soon, however, the process of learning commences; the senses first receive a knowledge of the agents which act specifically upon them; the eye becomes acquainted with light and afterwards notices objects which are presented to it; the ear is affected in like manner with regard to sound; the skin, the seat of the sense of touch, becomes gradually instructed in the more obvious properties of matter. Subsequently the infant learns to compare the impressions made upon the different senses, and to derive inferences from the comparison. A familiar example will best illustrate this dawning of intelligence. Thus, the mother's nipple is soon recognized by the sense of sight, and probably the first item of knowledge laid up in the memory is the fact that this is the source from whence nourishment is derived. A careful observation of the young infant will, however, soon teach us that although it very early perceives the nipple, and is not ignorant of its use, still it has at first no knowledge of its position in relation to that of its own body. Such knowledge is the result of a comparison between the impressions made upon two senses, and it is not until a later period that the information conveyed by the sight is corrected by the touch, so far as to enable the mouth or hands to be directed with certainty towards the object in question. After a short period, the power of perceiving external objects is so far educated, and the memory so well stored with facts, the result of observations, that the infant can determine the difference between persons, and becomes capable of recognizing its mother or nurse.

All this is really mental education, and that too of the most important kind; for how small a proportion does the learning of the schools bear to the knowledge of external agents, and of our own powers and relations, which we must acquire during the period of childhood, and without which we should be incapable of supporting our existence! What countless observations must be made before we ascertain our ability to speak or walk, and what a wondrous mass of facts must be learned before we understand in the most general way the difference between animate and inanimate bodies—between the firm and resisting land, and the yielding and unstable water!

We cannot, however, directly aid in the communication of such knowledge; the demands of the senses for their proper excitements will not fail to force its acquisition upon the young being; and we refer to it here, only to show that the young child who is permitted to use its eyes and ears, is always busily employed in learning, and that the hours of play are not to be considered as periods of intellectual idleness.

At what time the business of formally instructing the intellect, should be commenced, becomes an interesting question, and one upon which much difference of opinion exists; if we begin too early, we shall certainly injure the health; and if we delay too long, we shall often experience much difficulty in restraining the habits of bodily activity, (which in such cases will generally be acquired,) within limits favorable to the necessary exertion of mental powers. In this, as in most other matters, we shall probably find our best guide, if we carefully observe the plans of nature. She seldom fails to implant in the child a most restless and prying curiosity, which is in reality the appetite for knowledge, and should never be denied its gratification. Books and pictures never fail to attract the attention of very young children; and allowing them to apply it, at their own pleasure, to these, and especially to the latter, is doing for the mind precisely what we do for the body when we place it in the garden or field—it is giving it an opportunity of taking wholesome exercise, which will be desisted from upon the first approach of fatigue. In the one case the child will, itself, learn to walk and run with firmness; and as its muscles and bones become stronger, it will usually show an inclination to practise the more artificial exercises of riding and swimming. In the other case, an acquaintance will be imperceptibly established with the forms of letters, and of animals and other external objects; and the uses of the one being gradually learned, and a curiosity respecting the others being excited, a growing desire for information will lead the child to devote more and more time to its acquirement, until at length we shall find it no difficult matter to include among our periodical arrangements, an allotment of a short portion of each day for the purposes of instruction. The precise age for adopting this latter arrangement cannot be exactly defined—it must differ a little according to the strength of the child, but we conceive it should not be before the sixth year. The space of time to be allotted for instruction is also a matter of moment; it should never be long enough to produce fatigue, and we think should not exceed two hours daily during any part of the period of childhood.

When considering, in the last chapter, the subject of physical education, we avoided entering into a detailed examination of the various exercises suited to the development of the muscular system in youth, considering such a detail as lying rather within the province of the general physiologist, than of the child's physician. In like manner we now conceive that a special consideration of the *subjects* of mental education would be encroaching upon the domain of the moral philosopher; the *objects*, however, of this process, and the mode of attaining them, may fairly engage a small share of our attention, from their intimate connection with the bodily health of the child.

In the first place, then, we cannot but think that a grand mistake is very generally made with respect to the proper object of education, which is commonly supposed to be the storing of the memory with a quantity of verbal knowledge, with a mere crowd of words, often to the exclusion of the ideas which those words are designed to convey. Thus very young children are mechanically taught lengthy rhymes, or verbose catechisms of geography and history, and their repetition of these by rote is looked upon and exhibited by their parents as a convincing proof of a precocious understanding. All the time, however, the poor child comprehends nothing of what it has been repeating, and its memory, which, it must be recollected, has abundant employment during the first years of childhood, in storing up the facts derived from impressions upon the senses, has been, not wholesomely exercised, but injuriously fatigued by the exertion. We were much struck with the monstrous absurdity of this wordy instruction, upon observing its effects in some of the parochial schools of this country. Many of those institutions are under the patronage of a society whose inspectors annually visit them, and examine the pupils. The examination chiefly consists in ascertaining how much of the Scripture can be repeated by rote, and the rule is, that unless a certain number of children be produced, each capable of reciting, at least, four chapters of the New Testament, no remuneration is to be given to the master. The result of this system, as we have repeatedly found from personal investigation, is, that while so much as an entire Epistle will, in some instances, be correctly repeated, the sense of a single paragraph will often not be comprehended by the child. In the course of a very extended visitation of these schools, we have been repeatedly told by the masters that their own time, and that of the pupils, was so completely occupied with the committing of mere words to memory, that it became utterly impossible to pay any attention to their meaning.

Now, if we reflect for a moment upon the exercise to which the memory of the young child is subjected in laying up a knowledge of its relations to the things and persons which surround it; and if we recollect the mental exertion it undergoes in obtaining a practical acquaintance with its obligations to society, and receiving instruction as to its expectations of the future, we must surely pause before tasking it with the remembrance of words of which it is unable to comprehend the value.

The acquisition of verbal knowledge, or indeed of almost any knowledge which can be conveyed by words, we do not look upon as a legitimate object of *early* education. The effort should rather be made to instruct the mind in the performance of its functions; and in choosing a mode of doing this, due regard must be had to the order in which the mental powers are developed. The perceptive faculties, for example, coming earliest into play, the instructor's object should at first be to impress upon the child a knowledge of the properties and relations of matter in its various forms; and in doing this, he should, as far as possible, train the mind to habits of correct observation. Materials for thought will in this way be stored for future use, and at the same time an orderly and accurate habit of observing will be impressed upon the mind. As the reasoning powers begin to be developed, these, too, should be trained into their proper action. Comparisons should be instituted between things which have been already the subjects of separate observations. General laws may be explained, and the child may be encouraged to investigate the causes of various natural operations which it has previously observed. All this, however, must be done gradually, and with caution. The mind of the child, like its body, is incapable of great or long-continued exertion, and to subject it to such before its powers are developed, would be to urge it into premature decay. "We must not," to borrow the words of an ingenious writer, "attempt to force their intellectual growth, must not feed them with meat until they have teeth to masticate it. There is a great deal which they ought to learn, can learn, and must learn, before they can or ought to understand it."

So much for intellectual education: it must not be forgotten that our consideration of it has been restricted to the first eight years of life, and during that period it should scarcely, in our opinion, be made a matter of formal business, but the foundation of it should rather be laid by such playful exercise of the faculties as we have sketched. A more important subject, however, is what we have designated as *moral education.*

This commences at the earliest period of infancy, and, we almost believe, is finished for good or for evil, before the individual passes the epoch of childhood. In moral qualities the child is indeed father to the man; and the education of these requires the most anxious attention, even during the earliest periods of infancy.

No one who is familiar with the habits of infants can avoid observing, that from the moment of birth they display obvious marks of being endowed with active passions and affections, and that, too, in proportions varying much in different individuals. Anger is perhaps the first of these which is displayed to our notice, but shame and jealousy soon make their appearance, and also others, of a more amiable character, as compassion and brotherly affection. Now, we must recollect that these emotions, and all the other elements of our moral constitution, are originally designed, and implanted in us, for good. "It is very true," says Dr. Chalmers,[*] "that the anger, and the shame, and the emulation, and the parental affection, and the compassion, and the love of reputation, and the sense of property, and the conscience or moral sense, are so many forces of a mechanism, which, if not thus furnished, and that too within certain proportions, would run into a disorder that might have proved destructive both of the individual and of the species." We shall give an example of our meaning, and again in the words of the pious and eloquent writer just quoted. "The more patent view of anger is, that it is an instrument of defence against the aggressions of violence or injustice, and by which they are kept in check from desolating, as they otherwise would, the face of society."[†] In this way the passion of anger, (which we take merely as an example,) is not to be considered as in itself evil, which is too often the view taken by superficial observers, but it is to be looked upon as a necessary constituent of our moral system, without which we should be unable to feel a suitable abhorrence of sin or of injustice, such as in the present state of man is absolutely necessary for the holding together of society. It is only the improper direction of anger, or its indulgence unrestrained by the other elements of our moral constitution, which is productive of evil. In like manner, all the other passions and affections are designed for good: and we conceive, therefore, that our object in morally educating a child, should be, not to obliterate those forces of his moral mechanism, but to guide them into a system of harmonious operation with each other. Now, how is this most likely to be accomplished? Is it not by cultivating those affections which are more obviously good, and by their influence regulating the violence of others, whose unrestrained indulgence would certainly lead to evil?—Thus, the anger even of a very young infant will be best restrained, not by a display of anger upon the part of its parent, but by a steady exhibition of parental affection, and by showing it a practical example of calmness. Causes likely to excite irritability should also be carefully removed from the infant, as a habit of indulgence in anger will readily be acquired before the counteracting affections can be correspondingly excited.

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[*] Bridgewater Treatise, vol. i. p. 196.

[†] Op. citat. p. 208.

As the child advances in age, new passions and affections call daily for our notice; and as its mental education simultaneously progresses, and it is constantly acquiring an increased knowledge of external objects, we are furnished by this progress and knowledge with additional and powerful instruments for influencing its moral nature. He displays, indeed, but a small acquaintance with the human heart, who hopes by an apothegm to extinguish the passion of jealousy, or to repress the cravings of ambition by a dry statement of the unquestionable truth; that all is vanity. But, still the natural feeling of emulation, which is the commencement of jealousy, can be restrained within just and wholesome limits, by calling into play the family affection, and the compassion, which are equally original elements of the moral constitution; and the love of reputation may be prevented from growing into a dangerous ambition by encouraging, along with the affections just mentioned, a development of the conscience or moral sense, and of the sense of property, both of which we conceive to be inherent in our nature. The child may in this way be practically shown, that while a generous rivalry in its sports and lessons is not forbidden, still that benevolence, and natural affection for its brothers and playmates teach it to stop short, in every instance, of carrying this so far as to wound the persons or feelings of others; and, again, that while it may be lawfully anxious to obtain credit and praise from its teachers, still that its sense of property forbids it to seek for either by making an unpermitted use of the labor of others, and its conscience peremptorily interdicts any advantage which might be attained by a departure from truth. In this way we avoid over-taxing nature;—we do not vainly denounce, or attempt to obliterate, forces which are as much part of our moral frame, as hunger is of our physical;—we do not tell the hungry man he shall not eat, because gluttony is a vice, but we furnish him with a guide as to the quantity and quality of food which is wholesome and necessary. Above all the restraining principles, (if one may be preferred to another,) we would be inclined to endeavor with most care to bring into activity the sense of property; and conscience, or the moral sense, as Dr. Chalmers terms it. Upon these the well-being of society mainly depends; if not encouraged in early childhood, they are of all others the most likely to remain dormant; but if once well developed in the child, a long course of vice will scarcely effect their overthrow.

The progress of mental knowledge may be brought into useful operation in this part of our work, if we direct the growing faculties of the child to a contemplation of such portions of the general plan of nature as may be within its comprehension. Thus, admiration of the skill of Providence may, at a very early age, be excited by calling attention to the more obvious adaptations of means to ends, as in the forms of animals, in the benefits conferred by the mode of distribution of water over the earth, and in a thousand other examples which will constantly suggest themselves; and a perception of beauty may be called up in a very young mind, by the colors and fragrance of flowers, and the influence of music. From all these the watchful parent can derive practical lessons of humility and love, which would be sought, in vain, in the maxims of a dry morality.*

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* We are sorry to observe that Dr. James Johnson, in his able and justly popular work upon the "Economy of Health," has, in his desire to prevent the *abuse* of music, been led away from a fair appreciation of its *use* as an agent in moral education. We would heartily join with him in discountenancing the system which leads to a periling of the health of our young ladies for the purpose of converting them into opera singers; but this is altogether different from the wholesome use of music as a language proper for giving expression to the milder and for taming the fiercer qualities of our nature—as the gentlest, and yet most enduring of our social bonds. So far, perhaps, the advantages of music are generally appreciated, at least in the case of the upper classes of society; but its suitableness as an agent for the moral education of the poor, is, we regret to say, totally overlooked in this country, and yet the education which the poor man chiefly requires is to have his fierceness tamed, and his gentler affections called into play—to be bound to his fellow-man, by participation in a common source of enjoyment, rather than to be divided from him by that jealousy which must exist between the poor and the rich, whenever the intellects of the former are educated without simultaneous attention to their physical comforts, and simultaneous instruction of their moral nature. The poor man, as well as the rich, requires recreation after labor, a fact which appears to be totally forgotten by our philanthropists, who, while they enjoy the indulgences of their comfortable homes, can see no excuse for the intemperance of the hard-worked laborer, or artisan; whiskey, however, is merely resorted to as the only attainable means of relieving the exhaustion of protracted toil, and the first effectual temperance institution will be the placing within the reach of the poor, some tranquillizing and social amusement. Those who have mixed in the society of the lower class of beer houses and gardens, in the north of Germany, will not deny that music may be made to answer this end.

Many will admit of the justice of the foregoing views, but will ask, how are they to be acted upon? We answer—let those who have the direction of the great experiments of education at present in progress, abandon polemical controversies, and seek for guidance by examining the merits and demerits of systems which have been tried in other countries. If they inquire into the state of the Prussian and Saxon schools, and their enviable results in the happy condition of the people of those nations, they will, or we are much mistaken, change their course. They will probably be content with *training the minds of the children to work*, without burdening those who are to live by manual labor with much intellectual knowl-

To work out in practice the principles we have attempted to lay down, we are well aware, would require qualifications on the part of the parent or teacher, of no ordinary kind; and will, no doubt, in too many cases be impossible of accomplishment: but the nearer we can approach to them, the more likely we are to produce the *mens sana*, which we feel confident is fully as certain of producing, as of inhabiting, the *corpus sanum*.

Our limits forbid us to enter at greater length into this most interesting subject; but one word we must add, to prevent misconception. We have not yet spoken of *religious instruction*, as a part of moral education, because we have been considering the management of the moral faculties as they exist in the natural man: we are deeply convinced, however, of its necessity and importance; and we are firmly of opinion, that in no way can we promote the interests of an individual, both as regards himself and his relations with society, so effectually as by encouraging in him early habits of religious observances; in no way can we so surely call forth and strengthen his best affections, as by early setting before his view the living truths of revelation.

As general conclusions from the views we have put forward, we would say, that during childhood, (i. e. until the eighth year,) education should have for its main object the cultivation of the moral qualities; and that, during the greater portion of the same period, the intellect will be pretty fully occupied in obtaining such most necessary information, as can be acquired by the use of the senses without much *formal* assistance, and therefore that schooling, properly so called, should not be commenced, at the very earliest, before the termination of the sixth year. Until then, the confinement of a school is injurious to the bodily health, and not required for the mental improvement of the child. In coming to these conclusions, we may appear to undervalue those useful inventions of late years,—infant schools. We conceive, however, that they are designed for a specific purpose, which, when well regulated, they effect usefully,—viz. to take charge of the children of the poor in large cities, when their parents are engaged in daily labor, and unable to attend to their wants. In this view, the value of these institutions is inestimable; but still they are but the substitution of a lesser for a greater evil: all the ties of social affection, of well-regulated obedience, and of mutual co-operation, which constitute the bonds of society, are to be learned by the infant in the domestic circle, and can be learned no

edge: they will especially try to regulate the moral nature of their pupils, and they will, we hope, make musical instruction, as it is in Saxony and Prussia, a part of the system of every school. [Note to 2d Edition.]

where else. If we can leave it, therefore, in the care of an intelligent mother, and in the society of its brothers and sisters, we should not send it to an infant school, where it is governed by, and associated with strangers, with none of whom it is likely to have natural sympathies. What the child may be expected to gain specifically in these schools, beyond mere protection, can only be regularity of habits, which certainly is of great importance, but not so great as to countervail the advantages of a well-regulated domestic circle. For the reasons we have advanced, we conceive that infant schools, though most serviceable, in large cities, for the poor, are totally unfitted for the children of more opulent parents. With the latter, the system might be characterized, as Dr. Chalmers has done another artificial system, as "a taking to pieces of the actual framework of society, and reconstructing it in a new way or on new principles—which is altogether fruitless of good, and often fruitful of sorest evil, both to the happiness and virtue of the commonwealth."

Since writing the above, we have had the pleasure of reading an interesting little treatise on Infant Education, published in Chambers' Educational Course, Edinburgh, 1836. At the same time that we are most gratified to find that the principles which we have attempted to lay down for early education, are those sanctioned by the experience of Mr. Wilderspin and others, still we cannot change our opinion with respect to the class of society for which the infant school is really adapted; and we must be excused for preferring the family circle, as a place of education for the very young, in all cases in which it can be made use of without important sacrifices. We do not agree that the element of *numbers*, as Messrs. Chambers assert, is indispensable for exercising the social virtues of the child, particularly of the female child; but we acutely feel, that a tenderness, not less than parental, is required to keep unceasingly awake the sense of responsibility which ought to be felt by the infant's instructor: and we conceive that this responsibility is intended, by a wise Providence, not merely for the child's advantage, but also for a strong and wholesome check upon the morality of the parent, which it would not be beneficial to society to weaken by division, in any case admitting of its being left whole and undivided. [Note to 2d Edition.]

CHAPTER V.

PECULIARITIES OF DISEASE IN INFANCY AND CHILDHOOD.

I.—ETIOLOGY, (CAUSATION OF DISEASE.)

The great activity which pervades the whole body in the child, united to the peculiar susceptibility of the nervous system, and the abundant supply of blood-vessels, more especially arterial capillaries, predispose, in a particular manner, to the sudden occurrence of disease, its rapid progress, and frequently fatal termination during infancy, when organic change so readily takes place.

In addition to this general activity, necessarily connected with the process of general growth, we observe a peculiar state of excitement or increased action in particular parts of the body at certain periods of growth, when these parts are found in a special manner to undergo rapid development, and are hence peculiarly liable to become diseased. Thus, the brain is undergoing a particularly rapid process of growth about the time that dentition commences, or the teeth first begin to appear; and at this very time we find the mucous membrane of the intestinal canal also making an important progress in development, the mucous follicles or glands, beginning now rapidly to be evolved; so that independently of any morbid action, set up directly in connection with dentition, we have the nervous system naturally in a high state of susceptibility, about the period of its occurrence, and the intestinal mucous membrane in a condition of peculiar irritability. All this it is important to keep in mind the better to be able to meet the contingencies of this period; for these are mainly connected with this peculiar condition of the cerebral and abdominal systems, independently of the process of dentition, to which, however, it is the popular practice to attribute all mischances occurring at this age; an error not less unfounded than injurious, and against which we would, in a special manner, warn the young practitioner.

If one source of diseased action be a *plus* of vitality in any organ, as Broussais has taught, or an over-exercise of the natural function, in no subject is disease from such a source so likely to be found as in the child. This great activity of all organs and functions, however, while it predisposes parts so much to take on diseased action, confers at the same time a peculiar energy or power of reparation, in virtue of which the danger in infantile disease is in a particular manner diminished, when once the acute stage of the disorder has been subdued, or has subsided. Thus the danger in infantile complaints arises principally from the rapid occurrence of organic change, with fatal result, in the first instance,—the establishment of chronic disease being less liable to occur than in the adult, and more easily prevented; while, should such take place, the child has more chance of recovery, no matter to what extremity it may have been reduced.

The great nervous sensibility of the infant, and consequent irritability, is a prime source of disease, and gives a particular character to all disorders occurring in the child. Irritation is easily set up in any organ, by causes acting directly or indirectly upon it; and indirect or sympathetic irritation is very liable to occur in the child, particularly in certain organs, and is often presented in a very severe form. The most common seat of irritation arising from a cause directly applied, is in some part of the alimentary canal, and this is generally induced by the ingestion of unwholesome aliment. The presence of any irritating matter in the stomach or bowels of a child gives rise to symptoms often very formidable, particularly when it occasions sympathetic disturbance in the brain. The intestinal mucous membrane itself soon takes on the irritative action, and becomes the seat of disease; the attendant symptoms generally assuming the type of remittent fever. The suffering caused by difficult dentition is a familiar example of direct irritation, which, though slight in itself, may occasionally lead to most serious results, by sympathetic disturbance of important organs.

The lungs may be directly irritated, as by any impression of cold; but often are sympathetically affected in consequence of disease existing in the abdomen or occasionally in the head. The cough in the first case will be irritative, generally protracted, and may be violent; it is in the second usually spasmodic.

The brain is less liable to irritation from any cause acting directly upon it, though such may arise from the effects of the direct rays of the sun, mental disturbance, &c., but it often takes on this state, sympathetically, in consequence of disease in the digestive organs, or during the existence of protracted thoracic disease, especially if the cough be violent, as in hooping-cough.

From the observations we have been enabled to make, we would conclude that the head sympathizes most directly with the digestive apparatus, less so with the chest. The lungs sympathize frequently with disordered states of the bowels, less frequently with disorders of the head. The digestive organs sympathize readily with all the others,—remittent fever arising during almost all protracted diseases of childhood, as we see in most of the severe forms of pulmonary complaint; and the stomach and bowels are immediately affected on the occurrence of irritation or inflammation of the brain. The mucous membrane of the bowels, in particular, sympathizes with the cutaneous surface, many diseases of which arise from disorders of the digestive tube, which also soon disturb the urinary secretion.

In the infant, irritation, whether existing primarily or only set up as a secondary occurrence, readily passes into congestion or inflammation. In the brain, in particular, congestion often arises suddenly during states of irritation; or inflammation quickly follows the latter condition.

The greater number of the diseases of childhood are inflammatory, and inflammation in the child is generally very severe, and often runs its course rapidly, giving rise to remarkable morbid productions. Exudations of lymph, or other matters, are quickly thrown out, and occur in situations where they are not liable to be found in the adult—on the mucous membrane, for example, as we see in croup. Effusions readily occur in serous membranes, as the arachnoid; and softening or ulcerations take place in the mucous membranes, as we find throughout the whole tract of the intestinal canal. Inflammation in the healthy child exhibits, in a particular manner, its tendency to end in the formative process, or the effusion of coagulable lymph, especially when situated in serous membranes; but when occurring in the unhealthy subject, or towards the sequel of febrile disorders—as the exanthemata—the tendency is to serous or sero-albuminous effusions.

Plethora is frequently present in the child, and is often the result of over-feeding; but does not necessarily give rise to disease, as it does in the adult, the redundant material being consumed in the active processes of growth; excretion being naturally much exceeded by supply at this period, and general corporeal increase the necessary result.

The full fat child is a natural and wholesome object, and not so prone to disease as the pale slender subject of misguided solicitude, that has been doctored into delicacy, and which, though not so violently affected by inflammatory disease when attacked, is more exposed to illness, and more liable to protracted affections and relapse. It is in the child, reduced to a state of ancœmia, by previous illness, mismanagement, or mistreatment, that we meet with the most formidable maladies, and find all maladies presented in the most formidable shapes.

With regard to the inflammatory affections of children, no consideration is more important than to distinguish between the purely inflammatory, and those modified by the character of the inflammation, or the state of constitution. Active depletion which so surely arrests acute inflammation if early employed in the strong child, would be injurious or destructive in the low forms of inflammation occurring in debilitated children or those residing in unwholesome localities. Above all it is necessary to decide whether the disease or the individual be of a scrofulous character. This is the first question in affections of the head, for example, and which must decide, not only our view of the case, but the line of practice to be pursued—on nothing does success in practice depend more than on a knowledge of this point.

Morbid action once set up in the mucous membrane, shows a marked tendency to spread, or extend itself along the course of this membrane, in a manner that not only constitutes a peculiarity of disease in the child, but becomes a serious source of danger. Thus ulcerations or inflammation of the membrane of the fauces or pharynx are liable to extend into the œsophagus, or, more especially, into the larynx and trachea. The exudation thrown out in croup, tends to extend down the air passages; and even common inflammation of the bronchi often shows so strong a disposition to spread universally over the bronchial surfaces, that the danger of the disease in the infant is much more commensurate with the extent of surface thus occupied, than with the intensity of degree in any one place. So of the gastro-intestinal mucous membrane; it being equally remarkable here, that the tendency to spread is *downwards* along the mucous membrane, but seldom in the opposite direction.

Metastasis, or transference of diseased action from one part to another, is particularly liable to occur in the child—hence the popular dread of the disappearance, or *going in*, as it is called, of eruptions, exanthems, &c. &c.,—which apprehension, however, is commonly carried too far, and leads to very erroneous practice. We must, notwithstanding, shun the sudden suppression of inflammatory action going on in the skin, whether attended with fever or not,—as the eruption of measles, scarlet fever, extensive itch, or other cutaneous disease,—for this is often followed by morbid action set up in the alimentary canal, chest, or head. The first is perhaps most common; but in measles, the chest is often attacked under such circumstances, and at the close of scarlatina, the head. The suppression of an accustomed discharge, as chronic diarrhœa, may have the same effect; and this appears but natural, when we recollect the great susceptibility of the system, and the power of counter-irritation in the child.

Disorders strictly to be called nervous do not occur in childhood, though the nervous system is so susceptible and so subject to disturbance; but this usually displays itself in spasm or convulsion, and arises directly from morbid action going on in the brain or spinal marrow, or sympathetically, in consequence of disorder of the digestive organs. Convulsions occur in the infant, and epilepsy or chorea in the child; (the latter, in particular, about the fourth or fifth year;) and spasm of the glottis is an affection almost peculiar to childhood; but nervous affections, such as hysteria or hypochondriasis, are not to be seen at this age, neither do we often meet with neuralgic pains, although rheumatic pains are not uncommon, and we have seen them mistaken for neuralgia or tic douloureux.

Mental impressions, so fertile a source of disorders of the nervous system in the adult, do not in the same manifest manner affect the child, who, little disposed to anticipate evil, and quickly forgetful of past suffering, is possessed of spirits equal and lively, not disturbed by disorders of the imagination: and altogether in children, in whom organic life is so much more active than animal sensibility is acute, we may assume that distress from illness is much less felt than in the adult. Yet the deteriorating influence of the depressing passions upon the health may be witnessed in the pale and dejected appearance of children who, through a mistaken zeal, are subject to an over rigid discipline; or, we may behold painful examples of what may be termed infantile nostalgia, among children recently removed to our public schools;—the young heart appearing to pine in vain for "home and all its charities." Fear or anger, if sudden or violent, may produce serious consequences. We have seen dangerous cerebral irritation thus excited; and fatal convulsions, or idiotcy for life, have been caused in the child by a sudden fright.

Some disorders are congenital, or may be born with the infant, as syphilis, and occasionally hydrocephalus; as also affections of the alimentary canal. Some are peculiarly liable to occur immediately after birth, as purulent ophthalmia; while trismus nascentium is restricted in its period of invasion to the first nine days, never appearing after that period.

There seems to be an hereditary predisposition to the occurrence of certain disorders, as croup, and hydrocephalus, among the children of some families; all or most of whom are in succession attacked, and that often about the same age.

The common causes of disease affect the child with more severity, in general, than the adult; but from some the infant is perhaps free.

Irregularities of diet, or improper food, constitute one of the most frequent sources of illness in childhood; and derangements of the stomach and bowels, which are so liable to be thus induced, lead to serious results at this period of life. We have noticed the liability to dangerous sympathetic affections, particularly those of the head. Fever of an obstinate character, and generally of remittent form, is thus induced; and inflammatory affections of the abdominal viscera have their frequent origin in this cause. A single indigestible meal will cause flatulency and acidity to an inordinate degree, soon to be followed by diarrhœa and more serious consequences. Such occurrences take place frequently at the time of weaning; and we should always make inquiries on this point, when an infant suffering under such symptoms is brought to us. Indeed, so common a cause of infantile disease is disorder of the bowels, that many have regarded it as the sole source of children's disorders.*

Impressions of cold or damp, or vicissitudes of temperature, the most fertile sources of disease at all periods of life, are particularly so with the child: this we were prepared to expect, having seen that the infant has but low powers of generating heat, and so of resisting the injurious effects of cold, especially when associated with dampness. During sleep, in particular, (when these powers are at the lowest degree, depression both of circulation and innervation being then present,) there is a susceptibility of the injurious influence of sudden alternations of temperature; and to such the infant is especially exposed, much of its time being passed in sleep, even in the open air; and, when in bed, it often throws off the clothes, while warm or, it may be, perspiring. Here we have the origin of many inflammatory affections, particularly of the throat, chest, and abdomen.

Some forms of disease are said to arise often, in certain situations, in consequence of the lowness and dampness of the place, as croup, or even hydrocephalus, which latter is looked upon as almost endemic in the Valais, where the best effects result from the removal of children from the district.

Want of light and air is an abundant source of ill health in children, and consequent delicacy of constitution in the adult. Thus is scrofula commonly generated or called forth, and all epidemic diseases aggravated or spread. To such sources of malady, however, the children of the poor, especially in large cities, are sure to be exposed; and the detriment to the common weal arising from this cause, though now little noticed, is such as well to deserve national consideration. Indeed we know not if there be a more striking example of mistaken charity, than collecting together multitudes of sick infants into crowded apartments, as we see in some hospitals in Paris, where the character of the maladies, and the mortality, are without parallel in ordinary practice: and much misled will be the practitioner who takes the reports of such cases as his guide for a knowledge of the nature, pathology, or treatment of infantile disease.

We have paid particular attention to the influence of season, or states of the atmosphere, in generating or modifying peculiar forms of complaint in the child, and have found this influence to be most remarkable, so much so, as to cause an established uniformity in the variety of inflammatory affection prevailing at different periods of the year. This variety generally arises from a different tract of the mucous membrane being affected at different seasons; and a certain order or succession seems to be observed in the course of this morbid migration, which may be seen to commence with the nose and mouth, coryza and catarrh prevailing generally among children at the beginning of winter. Bronchitis, and the severer forms of pulmonary inflammation, appear as the winter advances, and prevail during the spring, especially in the earlier months. As summer approaches, disease lessens, and pulmonary affections nearly disappear; but as the season advances, the seat of disorder changes; and now the gastro-intestinal mucous membrane becomes engaged, and on the arrival of autumn, we have diarrhœa, dysentery, or cholera, constantly presented to us in the sick child; the tendency of disease to spread *downwards* along the mucous membrane, as already noticed, being here again to be observed. From attention to these particulars we may derive some information as to the nature of a child's disease, when it is only complaining or out of order.

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* Etmuller, in his "Valetudinarium Infantile," attributes the diseases of the first year to some peculiar alteration in the digestive system; Harris regarded acidity as the chief cause of infantile disease; and Sydenham attributed much to this cause, combined with debility. The increase of mucus consequent on intestinal irritation, we have already noticed; and this, Dr. Armstrong assigns as a prime source of infantile disorders; but erroneously, as it is to be regarded rather as a provision of nature, to protect the membrane from the injurious impression of improper ingesta, and relieve it by evacuation when irritated thereby, or from any other cause.

Autumn and winter seem to be the most unhealthy seasons, summer and spring less so; but this rule does not hold good alike in all towns, nor is the result the same in all years, and occasionally much illness obtains during spring. At this season some epidemic usually prevails, and we most generally meet with one of the exanthematous disorders to which children are subject. It is a more favorable time for the occurrence of such, however, than the winter months, as the approach of summer facilitates recovery during convalescence.

It has been doubted whether the very young child is susceptible of contagion; but infants have been born covered with small pox, and are said to have come into the world afflicted with hooping-cough; and we know that they may be affected with these complaints at the very earliest age, although antecedently to dentition there is much less liability to contract prevailing epidemics. Continued fever is a rare occurrence in the young child, being seldom, if ever, seen before the third or fourth year. During the prevalence of fever in the winter of 1838, however, we saw an unusual number of cases of fever in children, which was, in several instances, obviously received by contagion, and presented characters similar to those of the fever in the adults from whom it was taken, although there is no doubt that young children are not so susceptible of the contagion of fever as adults; nor is the disease so fatal to them as after the middle period of life.

Fever usually presents itself in the child in the form of symptomatic fever, or constitutional disturbance, attendant on some inflammatory affection, seated in one of the great cavities, most frequently in the abdomen. This form of fever usually assumes the remittent character, and may be presented in a severe degree in the more grown children; but it is remarkably modified by age, and the seat of the affection of which it is symptomatic; little or no constitutional disturbance being, at times, present in the very young infant, or before the sixth or seventh month; even though extensive morbid action may be going on, particularly in the abdomen.

There is a particular class of febrile diseases which spread epidemically, if not by contagion; as measles, hooping-cough, &c., that are peculiarly liable to occur during childhood, and generally prevail among many children at the same time. These disorders run a certain course, or last for a particular period; and during their progress, are liable to become complicated with some phlegmasia or local inflammation, whether occurring coincidentally with the invasion of the disease, or arising during its progress, thus inducing inflammation during fever, the reverse of what takes place in the class of febrile complaints just considered. Such complication is particularly liable to occur in measles, which often sets in with bronchial inflammation, or soon becomes complicated therewith. The same often occurs during the course of hooping-cough. In scarlatina, gastric affections are liable to arise; or cerebral inflammation may set in suddenly, at the conclusion of the disease; to say nothing of the ordinary attendant inflammation of the throat. In small pox, the pleura may be suddenly attacked by inflammation, although the abdomen is most frequently the seat of disease—but in all, these complications occur most frequently in very young children. These fevers are sometimes represented as peculiar to infancy and childhood, and the individual once affected is said never to have the disorder again. The same individual, however, may have any of these complaints a second time; but this is rare, though it occasionally happens, as with scarlet fever, and even small pox. The adult is certainly less liable to take these disorders than the child; but we have seen a person of seventy, in hooping-cough, and a mother will occasionally take measles from her own offspring. Of these complaints, small pox is that which has least of an epidemic character, being the most decidedly propagated by contagion; and is hence, perhaps, to be looked upon as less peculiarly a disease of childhood than the others. It is desirable that such diseases should have been passed through in early life; and we may be consulted as to the prudence of leaving a child exposed to any of these complaints, or removing it for security. If the child be healthy, and the type of the prevailing epidemic mild,* it will in general be best to allow the child to remain; but when the infant is delicate, teething, or only recovering from a former illness, and under any circumstances, when the type of the prevailing disorder is severe or malignant, it will be advisable to take every precaution against the malady. It is well, also, to keep in mind that contagion is most liable to be communicated at the decline of these complaints, after maturation has taken place, and while desquamation is going on. Hence, we may not be too late in separating children after the disease has actually appeared in a family; but cannot, with any safety, permit them to come together on its decline, or too soon, during convalescence.

Cutaneous diseases, to which children are so liable, from the delicacy of their skin, and the great sympathy between the cutaneous surface and the lining membrane of the digestive organs, partake not a little of the nature of the eruptive fevers, many running a regular course, or stated period of increase, maturation, and decline; while some are highly contagious, differing chiefly from exanthemata in the absence of fever. More unsightly than dangerous in their nature, when not mismanaged in treatment, we need not participate in the great horror in which diseases of the skin are held by the fond mother, who little likes to see the beauty of her offspring thus deformed; while as far are we from agreeing with the ignorant nurse, who rejoices in the great good which the constitution is to derive from the coming out of the eruption. Some may be occasionally beneficial, as points of derivation to counteract cerebral, or oftener, abdominal irritation, or that induced by the process of teething; and a few are, perhaps, critical. But none do we hesitate to remove after proper precautions; and many, which to ordinary means, prove most rebellious, will be found, in due time, to disappear, under a well regulated discipline. The protracted continuance, however, of most, does serious damage to the health, wearing out the child by constant irritation, inducing disorders of the digestive organs, and ultimately leading to a cachectic state, in which the glandular system becomes implicated, and mesenteric disease, at length, established. A few forms of disease of the skin appear only in infancy; some are most liable to occur during childhood; and all are modified by the influence of that age: but a large class is to be found in the adult alone.

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* The type of an epidemic is not to be judged of by the character of a particular case, but by the general character of the complaint then prevailing; as very severe forms of disease may be communicated by a mild case; the opposite occasionally occurs. [Note to 4th Edition]

Diseases of the urinary organs are not very frequent or formidable in the child; but a disordered state of the urine often exists even in newly born infants, and is easily induced by derangement of the digestive organs, when a deposit, mostly white, (appearing as the urine cools, or remaining after it has evaporated,) makes its appearance; or the urine is passed white, in the first instance. Gravel often forms in the child, particularly in the children of the poor, or in the offspring of gouty and dyspeptic parents; but this usually consists of lithic acid, and is presented in the state of a red deposit, or as an amorphous sediment, and passed without irritation of the urinary organs; or in the form of crystallized lithic acid, and accompanied in its passage by irritation more or less severe. Attention to these circumstances is most important, that we may, by timely interference, prevent the formation of calculus, to which children—at least, the children of the poor*—are peculiarly liable. The calculus will, in this instance, mostly consist of the lithate of ammonia, being generally of a clay color and small size, as occurring principally in children. *(See Prout on Diseases of the Urinary Organs.)* Symptoms of dysuria, however, are not confined to cases of stone in the bladder, but will attend irritation or inflammation of that organ itself, or of the abdominal viscera, as in the adult. Even ischuria, or total suppression of urine, may originate in this latter cause; or more directly from disease of the kidney. Absence of the urinary secretion is often a remarkable symptom in the febrile attacks of children during dentition, and particularly when the head is engaged; while as remarkable is the immediate benefit to be derived (especially to the cerebral disturbance) from a free flów of urine, whether arising spontaneously or induced by medicines. Deficiency of urine arises also from renal disease, and the most common disease of the kidneys in children, (those particularly of scrofulous constitution,) is that remarkable affection—albuminous nephritis—or inflammation of the kidney, attended with the presence of albumen in the urine, while there is deficiency of urea and salts. This disease in its acute or chronic form usually appears as a sequel to scarlatina, or is induced by exposure to cold. In the chronic form, when the presence of albumen in the urine is the chief or only symptom, the disease, though tedious, is not the same dangerous malady. But an opposite condition, one of irritability, increased flow of urine, or incontinence, is what particularly appertains to childhood, and is oftenest met with at that age. Dentition, so fertile a source of sympathetic irritation, not unfrequently displays its disturbing power in the urinary organs. A distressing state of dysuria may attend the cutting of the teeth; or more commonly, a great irritability of the bladder with a frequent and copious flow of limpid urine. This symptom also attends nervous irritability, from any cause, in the child as in the adult. This flow of urine in the child we have seen antecedent to attacks of hydrocephalus; occurring, probably, at that period when nervous excitement precedes inflammatory action. Incontinence of urine, however, is the morbid condition most incident to childhood, and confined more exclusively to that period of life.

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* Sir Benjamin Brodie remarks, in his Lectures on the Urinary Organs, that the deposit of red sand which occurs in adults among the rich, is found principally in children among the poor; among whom, also, children are much more liable to calculi than adult persons. And this from the same cause, though originating in a different source, namely, derangement of the digestive organs, caused, in the rich, by indolence and luxurious living; but in the children of the poor, by unwholesome diet and neglect: so do extremes meet. [Note to 4th Edition]

The mucous membrane of the organs of external sense, in the child, partakes of the susceptibility which characterizes the internal mucous membrane; so ready to pour out copious secretions on every slight irritation. The eye is subject to become the seat of disease at the tenderest age. The child may be born with cataract, or permanently dilated pupil. Infants, a few days old, suffer from purulent discharge; the ophthalmia neonatorum, generally appearing on the third day. Pustular ophthalmia attacks children under eight years of age: but scrofulous affections (which are the most serious) generally occur at a later period. Ulcerations and consequent opacities and other injuries of the cornea, are thus induced, and even the iris may become affected by the extension of disease from the external tunics; though scrofulous iritis is seldom seen as a primary disease. Hordeolum, or stye, is frequently met with in children; and small tumors, commencing on the edge, or tarsal cartilages of the eyelids, are not uncommon. Ear-ache often torments the child, and though generally a sympathetic affection caused by decay of the posterior teeth, it may be produced by cold, and then assumes an inflammatory character, when it is attended by a mucous or muco-purulent discharge, (ottorhœa,) so common in children, especially of a scrofulous habit. This is a tedious and disagreeable disease, often lasting for years; the discharge becoming thin, yellow, and profuse after the febrile symptoms subside, and very offensive, if much care be not taken. The glands of the neck swell; caries and consequent destruction of the bones of the ear may ensue, and caries may spread to the bones of the skull, by which life becomes endangered from extension of the disease inwards so as to cause inflammation of the brain or its membranes; such mischief is at times caused by scarlet fever of bad character. Deafness, more or less complete, arises from such affections, or from enlarged tonsils, obstructed Eustachian tubes, or inspissated wax within the ear. The latter may be detected by careful examination, and easily removed; enlarged tonsils generally subside after puberty, if not before removed by medical means; but deafness caused by destruction of the internal bones is incurable. The lining membrane of the nostrils is the seat of affections in the child, rare or unknown later in life. Tumefaction of this membrane, or chronic inflammation, is met with in very young infants, causing much torment by the quantity of discharge and by stuffing of the nostrils, affecting the child with what is commonly called the snuffles. At times the membrane swells into little fleshy, red eminences; but which are not to be confounded with polypi, though polypus (of benign character) is met with in the child. Ulceration of the membrane may follow, and in neglected cases, or unhealthy subjects, obstinate and fetid discharge from one or both nostrils takes place, constituting a case of ozœna; even though the bones be not diseased, which, however, they are liable to become; or ulceration may seize on the sides of the nostrils and spreading outwards, produce sad deformity; but such formidable results occur only in mismanaged cases or scrofulous subjects.

Scrofula is much a disease of childhood, though not confined to that period of life; neither does it often make its appearance before the second or third year. It is about the seventh year, or the period of second dentition, that scrofulous affections become most manifest. In the child, scrofula is particularly liable to display itself by attacking the glands of the neck; and enlarged tonsils are frequently met with at this period of life; but mere enlargement of the tonsils or cervical glands is not to be looked upon as necessarily originating in scrofula, or as constituting of itself evidence of its existence. Glandular disease is common at this age; mumps, an affection of the parotid gland, occurs usually in childhood; and even this is liable to be transferred by metastasis to other glands; the testicle, or the mammæ. Enlargement of the mesenteric glands, leading to disorganization, and the establishment of tabes mesenterica, usually commences during childhood. The pancreas, also, we have seen affected. Lombard found it the seat of tubercle, in one case in twenty of tuberculous children. The formation of tubercle in the child is not less remarkable than the liability to glandular disease, though it has attracted much less notice, and both seem alike allied to a scrofulous taint or strumous diathesis; but we agree with Dunglison in regarding the scrofulous and tuberculous constitutions, although congenerous, as so far distinct, that tuberculous deposit and glandular disease by no means necessarily go together. Infants have been born with tuberculous deposits in different parts of the body, and these in various stages of advancement, even to softening and ulceration. Tubercle seldom occurs in other parts of the body without being found at the same time in the lungs; and true tubercular phthisis is a disease which we have not only seen in the young infant, but which appears to be an affection to which children are so liable, (particularly about three or four years of age,) that an eminent writer treats of the phthisis (consumption) of infancy and childhood as a distinct variety.* We have seen such cases regarded to the last, as instances of remittent fever complicated with cough, and hopes thus held out which could not be realized. Tubercular formations are most liable to occur in the debilitated state of constitution following febrile attacks in children, or during protracted convalescence therefrom, and are often called into action by attacks of bronchitis, especially after remittent fever, measles, or scarlatina; or when the system has long suffered from severe cutaneous disease. Hence, there is a particular danger in inflammatory affections occurring under such circumstances in children, or under any circumstances in those of a highly strumous habit; such attacks being, in general, very insidious in their nature, not admitting of very active treatment, and appearing often to be connected with, or to end in, the formation of tubercle.—(See *Scrofula.*) This may occur even in cerebral inflammation in the child, a particular form of meningitis, hence getting the appellation of Tubercular.—(See *Diseases of Cerebral System.)*

The bones are often engaged in disease during childhood, and the scrofulous diathesis, which then so often obtains, doubtless contributes to this; but the greater vascularity of the osseous structure, also acts its part. If this contributes to the occurrence of disease, it also aids materially in its reparation; for recoveries may be looked for in early life, that could not be expected at a later period. It is in early life that we meet with those alterations in the structure of bone, which tend to the production of personal deformities; an early example of which we occasionally see in the deformed chest sometimes met with soon after birth, and known by the appellation of chicken-breasted—for a good account of which see *Copeland's Dictionary of Medicine—Article, Chest, (Deformities of.)* But more usually, and at a later period, we meet with distortions of the limbs, spine, or joints. These occur mostly where the strumous diathesis prevails, when the bodies of the bones are liable to be affected with rickets; or their articular extremities involved in the disease. Acute inflammation, on the contrary, seldom attacks the articular extremities of the bones in children, though not unfrequently seen in the femur or tibia; being the common cause of necrosis in these bones. In consequence of the great vascularity of bone, fractures unite with certainty and rapidity; and the greater softness of the osseous matter, also imparts the peculiarity, that partial fracture, or only bending of the bone, may take place; * while from anatomical peculiarities, some fractures can scarcely occur, as, for example, that of the neck of the femur. This power of yielding without being fractured, is remarkably exemplified in the bones of the head; for a depression will occasionally be found in the skull of the child from injury, which is in truth a mere bulging in, not fracture, and which will ultimately disappear without the interference of art; but which could not have taken place in the adult, without the bone giving way. The power of spontaneous rectification in cases of fracture, is also remarkable; for, however crookedly united, the bone has a tendency in the child to become straight, and will occasionally do so completely, even in bad cases.

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* See Sir James Clarke's valuable "Treatise on Consumption and Scrofula," p. 171.

A similar power of reparation exists in the soft parts; but great losses of blood are ill borne by the child; and the peculiar susceptibility of the nervous system, which gives such a tendency to the rapid supervention of depression or sinking, makes the shock from operations and injuries always dangerous—it may be fatal. Hence, surgical operations are generally objected to till after the third month.

II.—DIAGNOSIS, (DISCRIMINATION OF DISEASE.)

It is particularly necessary to be versed in the diagnosis of infantile disease, as our chief prospect of success in acute cases, depends on an early discrimination, so as to be able promptly to apply the necessary remedies; nor can we in the more chronic, hope for success, until we have accurately determined the seat and nature of the malady, and particularly whether it be a primary or secondary affection; while the little patient cannot in general give any information itself, or only such as is likely to lead astray.

This loss, however, will be the less felt, if we pay sufficient attention to the information conveyed by the physical signs in infantile disease, the appearance of a child imparting more knowledge to the experienced eye, than any account given by attendants could convey. We shall always have occasion, however, to inquire from them the history of the case.

The healthy child is cool, plump, and lively, the flesh firm,

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* See paper by Dr. Hart, in the Dub. Med. Jour. vol. i.

and movements free. It likes to be played with, and carried about. The abdomen is full and soft, and pressure upon it seems rather to please than annoy the child. The tongue is generally white, but not overloaded; and the mouth is always moist. It sleeps quietly on its side, with the limbs flexed, generally going to rest at the same hour; and awaking cheerfully, soon demands food. It is scarcely necessary to add, that the secretions are natural and regular. Not so with the child when ill: it is more or less peevish—dislikes being stirred, or even cries when handled; its hour of sleep is uncertain, and it rests ill, or awakes startled or crying. The skin is hot and dry, particularly the hands, feet, or head. The flesh is soft or wasted. There is thirst and a dry mouth, with unnatural appetite and depraved secretions.

When a sick child is brought to us, or we visit it, our attention should first be directed to the expression of the countenance, then to the attitude, state of the limbs, and skin. In the child in particular, the expression of the countenance or peculiar character of certain of the features, indicates a morbid condition of particular oagans; for at this age the muscles of the face are not endowed with much mobility, and the expression of the countenance is an index of physical, rather than mental, operations; sensation more than thought being expressed thereby. Three principal indications of physiognomy present themselves, connecting a particular set of features with one of the three great cavities—as we observed when speaking of the temperaments, and related in a similar manner. The expression of the upper part of the face, the forehead, eyes, and brows, indicating disease of the brain or nervous system, the features of the middle of the face, in particular the nose, being affected by morbid conditions of the organs of circulation or respiration; while abdominal affections are in a peculiar manner pointed out by the expression of the mouth or state of the lips.* We next proceed to examine more minutely into the several symptoms,—to determine the seat of the disorder, whether in the head, chest, or abdomen,—and its nature, or the particular lesion on which it depends.

When the brows are knit, the eyes fixed and staring, or looking wild or vacant, our attention is at once directed to the head. We try whether it is unusually hot, the vessels full or in over-action, and examine the fontanelle, to see if it be depressed, or in a state of distention. We now observe the attitude, and see whether the child's head hangs heavily on the nurse's arm, or rolls from side to side, sunk upon the pillow; and try whether the neck be stiff or retracted, which it occasionally is. We observe or inquire whether the child puts its hands to its head, as in health infants seldom raise the hand above the mouth. We examine the limbs, to see whether they be rigid or relaxed; lying motionless, or tossed about, and affected with spasm; in particular, we try whether the hands are clenched, and the thumb turned in, or toes bent. According as the upper or lower extremities are affected, one or both, an indication is given as to the seat and extent of the disease. The state of the pupil of the eye next demands investigation. It may be found contracted, and the child will start, as if frightened, or scream out, on being touched; or the pupil may be dilated and insensible to light,—the child being motionless or unconscious. We shall hear that the child has had starting in its sleep, grinding of the teeth, or movements of the lips; and that when awakened, it started up affrighted, or screamed out; the bowels are obstinately costive, or the evacuations very foul and dark-colored. The hands are usually hot, but the feet cold; and one cheek is often deeply flushed. No doubt can now exist that the head is the seat of disease; but what that particular disease may be, and whether a primary or secondary affection, is to be determined by symptoms hereafter to be detailed, in their proper place.

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* M. Jadelot has treated this subject with ingenuity and elaborateness, but we have not been able to discover all that he points out.

Occasionally we see a child lying completely prostrate, the limbs being relaxed and motionless, the belly sunk, and the eyes fixed, with the lids half-closed; we are told, however, that it is now much better than it was, as it had been affected with convulsions which have quite ceased; and no suspicions seem to exist that it is in the last stage of cerebral disease,—the attendants actually congratulating themselves on its quietness. It is not uncommon to find one or more of the extremities quite paralytic in the young infant, without any notice having been taken of the circumstance.

There is another expression of countenance very different from that last described, but which denotes much suffering. The lips are retracted, or drawn, so as to show the teeth or gums; the countenance is pale, or sallow and sunk; the child seems to dread motion, lies on its back, with the knees bent or drawn up, and is pained by pressure on the abdomen. Here neither the brow is knit, nor the pupil of the eye affected. The skin is very hot, shrivelled, and harsh; there is much wasting, great thirst, particularly for cold water, and a distinct diurnal exacerbation. The tongue is loaded, or dry, red, and pointed; aphthæ may be present; and diarrhœa constantly attends,—the stools being generally thin, green or dark brown, and fetid. The abdomen is here obviously the seat of disease;

and such a state of things often occurs at the period of weaning, as the state before depicted does during dentition.

In the autumnal season, we often see an infant lying sunk in the nurse's arms, the face pale, the features sharp, the lips apart, and the countenance betokening distress; it may be that the eyes are sunk, and the skin around them, as also the lips, dark-colored. On our first query, we will be told that the child has vomiting and purging; but a look must be sufficient to tell the experienced eye that this is a case of infantile cholera.

When a child coughs, the eyes are red, and the nose runs, with sneezing or snuffles, we know that it has a catarrh, but cannot say whether it may not be getting measles, or some epidemic then prevailing; we should therefore be cautious in our diagnosis, until the case has shown some more determinate symptoms.

Cough is a usual attendant on affections of the chest, and cough in the child is often violent or spasmodic. In the young infant, however, we must recollect that pertussis may be present without any whoop. When the larynx is the seat of disease, the cough will be acute or hoarse, according as inflammation or ulceration be present, and almost always spasmodic. The peculiar crowing cough of croup is an important diagnostic, which cannot be too early recognized. The young child almost always swallows any matter expectorated, and therefore this can scarcely become an object of diagnosis. Some of the false membrane in croup, however, is occasionally coughed up. We should always recollect the influence which the expectoration swallowed may have on the stomach and bowels, and allow for the effect which it must produce on the appearance of the stools.

The quantity of mucus thrown out, on even slight irritation of the mucous membranes, sufficiently accounts for the loud wheezing, or *râle* heard during the existence of pulmonary inflammation in the child; but this circumstance alone need not cause the alarm it often does.

The indications afforded by percussion and auscultation in the child differ in some respects very materially, from those in the adult, even in the same disease, while they often are very difficult of attainment, and not always of equal certainty as signs of disease. Hence, the use of the stethoscope in the pectoral diseases of children, must be studied as a subject distinct in itself; and will require to be actually practised before it can be correctly understood.

Antecedent to the information to be derived from auscultation, however, we have intimation from the expression of the countenance, and attitude of the child, as to the chest being the seat of disease. When acute or extensive inflammation is present, the respiration is hurried, the countenance discolored, the eyes more or less staring, and the alæ nasi dilated or in quick motion. Respiration is carried on more or less by the aid of the diaphragm and abdominal muscles; while the thorax remains comparatively quiescent. On the contrary, when the abdomen is the seat of the inflammation, it is by the thoracic muscles that respiration is carried on, the abdominal remaining quiet, and the alæ nasi unaffected, though the breathing be hurried. The deep depression noticed at the scrobiculus cordis and the upper part of the sternum, when respiration is very difficult, indicates a severe degree of pleuro-pneumony; but our intention here is not to forestal the diagnostics of particular diseases of the chest, but to furnish a general sketch by which thoracic diseases may readily be recognized and distinguished from diseases of other cavities.

The temperature of the skin, much more than the state of the pulse, is an indication of disease in young children. When above 100° F. fever may be considered to exist, according to M. Roger; who states, that inflammation of the lungs and typhus fever, are the diseases attended with greatest rise of temperature. If the pulse and respiration be quickened, and the heat amount to 106° or even 104° pneumonia may be pronounced to exist. In typhus, though slight, the temperature may be high, while the pulse is moderate; but in inflammation of the bowels, though severe, the temperature does not reach 104°. There are few disorders that cause lowering of the general temperature, which is, however, partially diminished in cholera, paralysis, &c. &c.,—but this is said to take place in a remarkable degree, when induration of the cellular tissue occurs in infants. The range of temperature in the child varies nearly 20°, almost three times greater than the variation in adults.

It is very necessary, but often difficult, to determine the existence of pain and its seat in the child; or the cause that may make an infant cry. The character of *the cry* will vary according as it arises from acute suffering or not, and will also be modified by the age of the child. In the young child, especially, when fresh and robust, the cry that arises from acute suffering is clear, loud, sounding and continuous, and has been remarked as belonging more to the expiration, than inspiration; the latter being in this case short, and lost, as it were, in the former; when the child is feeble or fatigued, however, and cries more from annoyance than suffering, the cry of inspiration seems to prevail, being longer and more marked, especially as the child grows older. There is also in this case more of sobbing, and sighing; and the circulation is little if at all accelerated. A hoarse cry, if not caused by exhaustion, should cause attention to the state of the larynx, more particularly if the cry be dry and husky, such being caused by an erythematous or aphthous condition of the organs of voice. A peculiar ringing sound in the cry is often our earliest warning of the approach of croup or spasm of the glottis—the sound of *the cry* in the child supplying those indications which we derive from the voice in adults. The shrill peevish scream that characterizes the advanced stage of hydrocephalus can hardly be mistaken; but in general the pain of acute inflammation, rather checks than excites crying in the child, a low moaning or sighing, being rather the sounds of distress that belong to that state. To determine the seat of pain, we observe whether the child puts its hand to the head, throat, or other place, as if indicating distress; and if this indication be corroborated by other symptoms, and it does not appear that the child is hurt by any thing in its dress, we may consider that part to be a seat of suffering. We have thus been led to detect otitis in the infant, when its cries could not otherwise be accounted for. We must be cautious not to credit a child's statement of having pain (or, as it generally expresses it, 'being sick') in the head, stomach, or elsewhere, without getting it to point to the part complained of, but which it often misnames. The peculiar expression of the countenance also assists us: the brows being contracted, when the uneasiness has its seat in the head; the lips drawn and apart, when in the abdomen; and the alæ nasi in motion, when the respiration is impeded and painful.

The softness of the muscles or degree of emaciation to which a child is reduced, are important in diagnosis, but not to be judged of by merely regarding the face: this may appear full and firm, and yet the rest of the body be much reduced.* In mesenteric disease, the emaciation proceeds steadily, but may be slow in progress. Derangement of the intestinal mucous membrane is soon attended with softness and wasting of the muscles; the body of the child wasting much more rapidly than that of the adult, under the influence of any cause that impedes digestion. In protracted cases the emaciation becomes extreme—the skin growing harsh, dry, wrinkled, and discolored; and the countenance often assuming an appearance of old age that looks almost unearthly.

When consulted respecting cutaneous disorders in children, it is important to be able to determine which are contagious and which are not; and in particular, we should make ourselves familiar with the forms in which psora or itch may be presented, as it appears often in a very severe form and has been taken for a syphilitic eruption; while syphilis is at times overlooked, and the child perishes before the true nature of the disease is discovered.

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* The observant nurse, curious in such matters, will point out the firm or flaccid state of the scrotum as the best indication of good or bad health. [Note to 4th Edition.]

III.—PROGNOSIS, (FORESHOWING OF THE EVENT.)

Determining the nature of a disease will often at once decide our prognosis. Thus trismus nascentium is almost necessarily fatal; and a particular form of hydrocephalus generally so; while syphilis, however severe in the infant, may almost certainly be cured: and so of other diseases.

In no class of complaints is correct diagnosis of more importance than in children's, as so much of the danger arises from their not being distinguished in sufficient time to allow of a prompt employment of remedies. Thus all acute inflammatory affections are highly dangerous in themselves; but if seen sufficiently early and detected, our prognosis may be favorable, so influential will always be found adequately active and judicious treatment. When the acute stage has passed by, or been subdued, we have again excuse for a hopeful prognosis, even though some organic change may have taken place; so vigorous in general is the infant constitution, and such powers of reparation does it possess.

Generally speaking, we may say that, however severely a child may be affected in the first stage of an acute disorder, or to whatever extremity it may be reduced in the progress of a protracted one, it will be wise not absolutely to give up hope, however guarded our prognosis may be. Few who had not witnessed it, could credit the immediate benefit to be derived from the employment of sufficiently energetic means in the early stages of the severer forms of infantile disease; or the apparently moribund state from which a child may be restored by judicious management. One evil arises from early despairing of a child, which the practitioner should keep in mind and guard against. The attendants, who are always ready to give up administering medicines, which they often look on as only a source of annoyance, will from that time do nothing; and thus children are allowed to perish for want of proper perseverance in the administration of the remedies prescribed.

On the other hand, we should inquire carefully as to the plan of treatment that has been pursued with a child which has been long ill, and which may be brought to us in an apparently hopeless state, and, before we pronounce an opinion, see whether that state be not owing more to the remedies employed than the original disorder. Thus we often see children run down to the last extremity by incessant purging, which will almost of itself cease, if the *little powders* which it has been for so long a time taking, be but discontinued; these powders almost invariably consisting of calomel, or some other irritating medicine. Or, a child which appears to be in the last stage of hydrocephalus, may be found, on examination, to have been brought into this state by the excessive evacuations to which it has been subjected: and of course, the mistake being discovered, our prognosis may be more favorable than it otherwise would be.

Again, if we find our efforts to subdue inflammatory action ineffectual, though apparently sufficient for the object proposed—that in fact the child, though relieved after each application, is again quickly thrown back,—we may suspect improper interference on the part of attendants, who are usually in dread of the little patient being too much weakened. By at once charging them with the delinquency, or expressing our opinion that *now* some stimulant would be beneficial, we shall in general obtain a confession, made either in contrition or exultation —the attendants owning their fault, or boasting of their sagacity in knowing that wine or spirits was required, and having administered it accordingly. Having thus discovered the source of failure in our remedies, our prognosis may consequently improve.

We have noticed the liability to the occurrence of sympathetic affections in the child. In such affections there is less danger than the symptoms would indicate did they belong to a primary disease, particularly when the true nature of the case is early detected, and the original source of disease removable. We must keep in mind, however, that functional disorder, if continued, will change into organic disease, and that the secondary affection may thus become more formidable than the primary, which must influence our prognosis accordingly. This tendency to sympathetic affection, or disease arising secondarily during the progress of any disorder, in the child, is in itself a particular source of uncertainty and danger; and must make us always guarded in promising absolute recovery in any complaint that has to run a certain course, or shows a tendency to become protracted. Thus remittent fever, however slight at the commencement, is liable to be tedious in its course; and so time is allowed for the occurrence of sympathetic affections of the head or chest, which but too often supervene. In no disease is the necessity for this precaution better exemplified than in pertussis.

We have already pointed out the greater liability of some of those sympathetic affections to occur than others. It now remains to notice the degree of danger with which these complications are liable to be attended. This will mainly depend on the facility with which the original disease may be removed, or the degree of interference with treatment which the complication involves. Thus the combination of pulmonary inflammation with gastro-enteritis, or the occurrence of either during the existence of the other, is particularly dangerous from both sources. When the head becomes engaged during the existence of pertussis, the danger is augmented in consequence of the persistence of the primary disease, which has to run its course; and the occurrence of gastric, or intestinal irritation, during affections of the head or chest, adds much to the danger by embarrassing the treatment; as the free use of aperients or antimonials is then precluded.

The type of the prevailing epidemic will give us an early intimation as to the liability of danger, in many instances. There are times when measles and hooping-cough are comparatively mild complaints; while, again, a most dangerous character, or malignant type, will, at some seasons, prevail; so that to be attacked, is to be in danger.

When an hereditary disposition to the occurrence of particular diseases of childhood exists, such diseases when they do occur must be looked on unfavorably, and all preventive means should be adopted to avert them. The same rule holds good with respect to disorders arising from particular situations.

One peculiarity in the symptoms of disease, as it approaches a fatal termination, is often manifested in the child in so remarkable a degree, as in a special manner to call for precaution, to prevent our being signally misled in our prognosis. We allude to the remission, or at times total suspension of severe symptoms, which occasionally precedes death, but by the unwary will be taken as the harbinger of recovery. In no instance is this more striking than in affections of the head in the child. Consciousness or even intelligence may be suddenly restored just as death was expected—but they prove to be only precursors of the fatal moment.

CHAPTER VI.

INFANTILE THERAPEUTICS.

I.—GENERAL OBSERVATIONS.

In nothing are the peculiarities of infancy more remarkable than in the influence which they exercise over the action and the use of medicines; and of no subject is a special knowledge more necessary for the successful treatment of infantile complaints. Most medicines act with great energy on the child, and some have a peculiarity of action differing from that in the adult; while all require to be given in diminished doses, regulated by the age. If attention be not directed to these points, the practitioner can hardly fail to meet with embarrassment in treating infantile disease.

An attempt was long since made by Gaubius to express with arithmetical precision the difference of dose according to the age; and his table is useful, though not always implicitly to be followed. According to his arrangement, if the dose for an adult be one, half the quantity will be the dose at fourteen years of age, (or puberty,) and half this again, or a fourth, at four years of age, and again half this, or an eighth, at two years. Expressed in a tabular form, with the intermediate ages from childhood, the table will stand thus:

Dose for an adult,	1, say 1 drachm,
For a child 7 years old,	⅓ " 1 scruple,
" 4 "	¼ " 15 grains,
" 3 "	⅙ " 10 grains,
" 2 "	⅛ " 8 grains,
" 1 and under,	1-12 to 1-15—5 or 4 grains.

We have here a useful general index, and of practical application, but to attain facility in prescribing and accuracy in adapting our doses to the different ages of childhood, attention must be paid to the several medicines themselves, and the action of each dose watched so as to suspend the use of the medicine when the desired effect is produced; or hasten its repetition when this is too long delayed. With children in particular, we avail ourselves of the advantages to be obtained from administering medicines in divided doses, so as to ensure the result proposed, neither more nor less. Thus, opiates require to be given at first in very guarded doses, and the repetition of the dose carefully watched; while purgatives will often fail of their effect even in very young children, and unless the dose be quickly repeated, or the form of the medicine varied, much valuable time will, in some instances, be lost before the desired effect on the bowels be produced. To specify the precise dose of every medicine according to each year of age, would be but to attempt the performance of a tedious task, more calculated to complicate than to simplify the subject. Under the head of each medicine, however, we shall assign the doses for the earlier years of childhood; and supply a set of formulæ exhibiting such combinations of medicines as we have found most serviceable in the treatment of infantile disease. For the sake of uniformity we have made our mixtures to consist of two ounces, as a quantity convenient to order for a child; and the doses prescribed are adapted to the *first* two years of life; after which they may be increased one half until four years of age and then be doubled.

The number of medicines which it is necessary or advantageous to give to the child is not great; and still more are we limited as to our mode of administering them; the liquid form or that of powder, being almost the only shape in which medicine can be given to the young child. No less important an object is it to render medicine as much as possible palatable to the taste, as all must acknowledge, who have witnessed the misery, and often injury, caused to children, by the forcible administration of nauseous drugs. We should endeavor, then, to select such medicines as are most free from strong taste or smell; and moreover try to disguise their flavor by the addition of sugar or syrup, children being so little select of taste, as in general, to deem that good which is sweet; while we not only choose the most convenient form, but the least bulky dose. Hence, very light powders (as pulvis sennæ) are inconvenient for administration to children, and in no case should the quantity of a powder exceed ten grains. When very heavy or insoluble, the vehicle selected for the exhibition of a powder should be sufficiently thick for its suspension, when mixed therewith, so as to ensure the whole being swallowed. The dose of a liquid medicine is from a tea-spoonful or drachm, to a dessert spoonful or two drachms; a larger quantity being objectionable, in one dose, for an infant.

Medicine is not required in all cases of illness in the child, alteration of diet or in the mode of management being often sufficient; and in many instances the mildest medicines will suffice. This is no excuse, however, for giving nothing but ptisans or syrups to infants, and so letting them perish in acute disorders through fear of using adequate means. When obliged to employ active measures, it is necessary to be prompt in their application, and carefully to look for the earliest moment when their use may be suspended and milder means resorted to, or the case left to the resources of nature; which in infancy are so powerful when the strength is not too much broken by the protracted use of depletion.

We must be attentive to support the child by suitable nourishment during illness; at least it must not be left too long without some kind of sustenance, as the infant cannot exist many hours without food; and we would solicit particular attention to this precept, neglect of which we have seen attended by fatal results. During febrile or inflammatory complaints, the diet must be restricted to barley-water, whey, or very thin gruel; even the breast milk may be too stimulating, and will require to be mixed with water or exchanged for lighter drink; but this must be supplied at sufficiently short intervals. During depression or convalescence, change to a more nourishing food than usual will serve, to a certain degree, as a substitute for stimulant or tonic medicines; so susceptible of excitement is the child.

Change of air exercises the most beneficial influence in infantile disease, often putting an end to protracted illness in a few days. With the child we can avail ourselves of this measure at an earlier stage of acute disorders than with the adult. Being brought abroad or changed to another room in the same house, (if more elevated and airy,) will almost always be useful; and we cannot be too particular in insisting on the apartments of a sick child being kept cool and airy, at least sufficiently ventilated and of an equable temperature. When laboring under affections of the head, however, or recently recovering therefrom, there is risk in too sudden exposure of the child to the excitement of light and air by bringing it abroad; and danger in the fatigues, added to the excitement of a journey, so that we should prefer, in the first instance, seeking the advantages of fresh air, by its admission into the chamber, while light and noise were, at the same time, excluded; and even after convalescence had been established we should rest satisfied with merely bringing the child abroad, without venturing upon a journey for the sake of change of air, until the condition of the nervous system warranted us in hazarding the disturbance thus likely to be induced. Inattention to these considerations we have seen attended with disastrous consequences, relapses being thus brought on, or cerebral symptoms altogether induced, during recovery from merely febrile disorders. In some disorders of the chest, particularly in the chronic form, or when accompanied or induced by a spasmodic affection, the good effects of change of air are often most remarkable; as in chronic bronchitis, the advanced stages of pertussis, and occasionally even in spasm of the glottis; the beneficial influence of change of air being not less remarkably manifested in lessening irritability and restoring tone to the nervous system, than in producing similar effects upon the mucous membranes. In all affections of the abdominal viscera this is uniformly the case; particularly in protracted forms of remittent fever, and in all forms of diarrhœa or dysentery.

Climate.—In broken down states of the system, and especially in those cachectic conditions induced by or connected with strumous disease, not only change of air, and travelling, but change of climate, become absolutely essential to the restoration and preservation of health. A moment's reflection on the influence exercised over the structures of the body during growth, by the effects of the locality in which a child is placed; or recollection of the direct results observable in the health from the same cause, must prepare us to expect most important benefits from residence in a dry, equable, and warm climate; as we are so repeatedly obliged to deplore the miserable results of residence in situations of an opposite character. But it is not merely as conclusions from reasoning, however just, or principles however sound, that we draw these inferences; but as the results of actual observations and long experience in the climates of which we speak, and which lead us earnestly to call the attention of the profession (as we find that of the public has already been directed) to the great advantage of employing change of climate, as a resource in the delicacies of childhood, without waiting for the more hopeless effort of employing it as a last refuge to escape from the delicacies of youth. Whatever form these degeneracies of health may assume, we know how essentially they are connected with, if not dependent on, tubercular formations; and we have already noticed the relation of these to strumous disease. How much better, then, to take effectual—indeed, the only feasible—means of averting in childhood that tendency to degeneracy of constitution, which is so certain, in such cases, to manifest itself in youth, than to delay combating the evil until it has arrived, and we have to contend with some of those actual deposits of tubercular matter, which can so seldom be restrained, and never, perhaps, removed.

In children so disposed—subject to glandular enlargements, and membranous inflammations, (whether exhibited in the form of frequent bronchial attacks, liability to croup, or gastric and intestinal irritation)—threatened with hydrocephalus or mesenteric disease—we would recommend immediate removal for the winter months to the more genial climates of the south of France or Italy. This removal will be seen to exercise its best results so early as three or four years of age; but more particularly at the ages of five or six, and especially seven, when, at the period of second dentition, strumous affections are so liable to develope themselves, or become established in the constitution. We have, in such climates, seen children pass a whole winter without one day's illness, and every day in the open air, who had for more than one preceding winter been seldom out of the sick room, and never, perhaps, once out of doors.

The places on the Continent best suited as winter residences for children are Nice or Rome; but in the commencement of the season, Naples is equally eligible: and for those with whom a soft, but rather moist atmosphere is calculated to agree, Pau is a convenient place to select. Having passed a winter in all these places, we are, unfortunately, but too well qualified to speak of the relative merits of each. Rome is commonly considered the most eligible for the child; and this opinion receives the high support of Sir James Clark; but as a place of common resort for delicate children, we would decidedly give the preference to Nice. The place to be selected in any particular instance, however, must depend upon the nature of the case; but, as a general rule, the dry, invigorating, and even exhilarating air of Nice, (situated, as it is, on the sea shore, and with its atmosphere often highly charged with electricity,) will best agree with the feeble frame and delicate constitution of the sick child, whose deficiencies of health are so often connected with strumous disease. Where the tendency is, on the contrary, to acute inflammatory attacks, the nervous system excitable, and the mucous membranes disposed to irritability, the mild and equable temperature of Rome, little disturbed by high winds, and occasionally softened by the relaxing sirocco, will be found to agree best; and if a single place is to be selected for both winter and spring, Rome is that to which preference must be given. Naples should never be persevered in as a residence, on the approach of spring; but the child be removed to Rome, or the still milder air of Pisa, early in February, when the keen northern and north-eastern winds begin to blow. The same change will be occasionally necessary at Nice, but not so frequently, nor then at so early a period—not before the middle of March. Children who suffer from cerebral excitement, or other irritation during the time of teething, should not be brought to Nice or Naples at that time; nor permitted to remain during the period of dentition. Pau is very free from cold spring winds, but the moistness of the atmosphere must be taken into account, as with strumous children, in general, it is dampness rather than cold that so much disagrees. Where passive diarrhœas exist, with a lax state of frame, or open ulcers are present, such a climate will disagree, and Rome, in particular, should be avoided, as ulcers heal ill there, and diarrhœa is liable to occur during the prevalence of the south wind. Nice, as a permanent residence, or Naples, at the commencement of winter, will best suit such cases. The choice of a particular house is of almost as much importance as the selection of the place in which to reside. Inattention to this point may forfeit all advantages of a change of climate. Not only must a good quarter of the town be chosen, and the aspect of the rooms be southerly, but we should be certain that the sunshine actually enters the appartments, unobstructed by opposing buildings or any other obstacle. Hence, the upper rooms of a house are often preferable to those lower down, as admitting the sun when the others do not. In sending children into the open air, great care must be taken to protect them from the rays of the sun in spring; and it must not be forgotten that the brightest sunshine is often co-existent with the keenest wind, when the ailing child should not be permitted to go abroad, however fine looking be the day. In the management of children's diet, the principal point to be remarked is the necessity of diminishing the quantity of milk, which is not found to agree well in Italy. But the light and excellent *bouillon*, or broth, will, in part, make a good substitute; and goat's milk (always easily to be had) will be found excellent; the fact being, that it is the want of good pasture rather than any other influence of climate, which causes cow's milk so much to disagree in those countries.*

During a journey, children are liable to have their bowels out of order. Irregularities in diet may cause diarrhœa, and such not unfrequently occurs; or deposits may appear in the urine, just after the journey is over; but during travelling, a state of constipation is that which is oftenest present, and even diarrhœa, which had before existed, ceases. Hence, a lax state of bowels should not prevent a child being taken to travel; and the constipation which may occur is easily mitigated by any mild aperient. But the great and important matter in bringing children abroad, is so to conduct the journey, as not to injure the children by over excitement and fatigue—in fact, to keep in mind, that it is for the benefit of the child, not for our own amusement, that we travel—a matter, forgetfulness of which has caused much misery on many a journey.

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* Those who have seen cows feeding on the refuse vegetables of the stalls, largely intermixed with orange and lemon peel, or these fruits themselves, as we have seen in Italy, will feel no surprise if their milk is not accounted wholesome.

II.—MERCURY.

Of medicines which act in a peculiar manner on the child, one of the most remarkable is mercury; which proves, according as it is well or ill employed, the most useful or injurious medicine given to children. Mercury may be administered with impunity to the youngest child; and, indeed, infants often appear to bear large doses better than adults; but this by no means excuses the universal and empirical manner in which mercury is too commonly dealt out to children; nor secures us against the evils which this abuse of so active an agent, is certain, sooner or later, to entail. One remarkable circumstance connected with this mineral is, that mercury does not seem capable of *salivating an infant.* We have never seen it do so, nor are we aware of any such case being on record; our experience, in this respect, coinciding with that of Dr. J. Clarke, as we have never succeeded in salivating a child under three years of age—indeed, even at four and five years old, it is not easy to do so. But we would here give warning, that in children after that age, at six or seven years and upwards, sudden and severe salivation is liable to take place, when mercury is given in any large dose, while the strength is broken down after fever, or any of the exanthems; more especially if much mercury has been given (as it too often is) during the previous illness. This is a frightful and fatal affection, which, although it must be well known to practical men, has been but casually noticed by medical writers; we shall therefore, treat especially of the subject, under the head Cancrum Oris *Mecuriale,* (which see.) To the frequent employment of mercury has also been attributed that premature tendency to decay, which sometimes leads to the almost universal destruction of the teeth at an early age. The absence of salivation in the infant somewhat impedes us in the employment of mercury, in acute inflammations; at least, we are thus deprived of a useful criterion, by which to judge of the effects of the medicine on the constitution, and so to regulate its administration. Hence the pushing of mercury, so as to induce salivation in inflammatory diseases and thus cut short the complaint, as we do with adults, cannot be practised with the young child. But mercury, notwithstanding, constitutes our chief agent in subduing inflammatory action in infantile disease, and accordingly we find that some consider mercury as exerting a special influence in controlling inflammation, independently of salivation. However this may be, we are not to overlook the influence which mercury is acknowledged to exercise upon the secretions, especially of the bowels, and which is particularly manifested in the child; though it falls short of a specific influence in arresting inflammation, and is liable to do mischief, if not cautiously dealt with. In connection with this power, mercury has the character of quickening the action of other medicines, and so ensuring their effects; and hence it is often joined with diaphoretics, expectorants, cathartics, &c.

It is its action on the intestinal canal, and particularly the biliary secretion, that is most manifest in the child; and some give a preference to calomel as a purgative for infants. No mistake can be greater: though occasionally useful, it is at all times liable to create intestinal irritation, and its continued use is certain to cause it, producing griping, diarrhœa, and green stools; accompanied by fretfulness, feebleness, and pallor.

This irritation, however, is sometimes resorted to in the treatment of cerebral affections, as a source of derivation or counter-irritation. On the other hand, the occasional use of a mild mercurial is serviceable, by restoring the natural functions, when the stools are very foul and unnatural in appearance.

Calomel is the preparation of mercury most frequently employed with the child, particularly in inflammatory affections. Blue pill is an inconvenient form, but useful preparation, and may be given bruised down in some liquid. Hydrargyrum cum cretâ, vel magnesiâ are mild mercurials; and from their mildness and combination with an antacid, are peculiarly suited to the bowels of children, when acidity is present, with or without diarrhœa. Calomel may be given alone to act on the bowels, in doses of from one-fourth to one or two grains at most, and usually requires to be followed, in two or three hours, by a dose of castor oil, or other aperient. Calomel is generally given in combination with other medicines, as purgatives, to quicken their operation; or with ipecacuan, squill, or James' powder, as an expectorant or diaphoretic. The dose is usually one-fourth or half a grain, or, at most, a grain or two, repeated every second or third hour.

It is in such combinations and in such manner, that calomel is given in inflammatory affections, according to the seat or nature of the inflammation; combined with aperients in affections of the head, and with expectorants or antimonials in thoracic inflammations and inflammatory fevers. When the intestinal mucous membrane is the part affected, or we fear the mercury running off by the bowels, an opiate (most generally Dover's powder) is added, or mercury and chalk selected instead. When inflammation is very acute, seated in an important organ, as the head or throat, or very protracted, as in chronic hydrocephalus, we employ in addition mercurial inunction, to aid the influence of the medicine on the constitution. In urgent cases, this must be freely had recourse to, even in infants; for although the gums will not be made sore, we shall find the mouth grow hot, and an indication thus afforded to regulate our use of this remedy. From one scruple to half a drachm of the strong mercurial ointment may be rubbed in, twice a day, after the first year of age.

Mercurial inunction has been recommended for the cure of infantile syphilis; but will hardly be found necessary; neither need we often have recourse to calomel, for the treatment of a complaint which will be found almost always to yield to a mild course of hydrargyrum cum cretâ. (See *Syphilis.*)

The hydrargyrum cum cretâ is given particularly when diarrhœa is present, and a mercurial indicated; but in this case the dose must be small, (not exceeding one grain,) or combined with an opiate. Hydrargyrum cum cretâ alone is by no means to be taken as a cure for diarrhœa, as some seem to suppose; and even when guarded by an opiate, any mercurial is, in certain cases, injurious.

Mercury, in fine, constitutes one of the most powerful but dangerous medicines employed in infantile therapeutics. In inflammations of membranous tissues with tendency to effusions of serum or lymph, the use of mercury, after depletion, constitutes our most efficacious agent of cure: particularly in inflammatory affections of the serous membranes, as meningitis, peritonitis, pleuritis, &c. In ordinary inflammation of the mucous membrane of the air passages it is less frequently required; but in those forms in which lymph is thrown out, as in croup or diphtherite, the necessity for its use becomes again equally urgent, as also in the inflammatory affections of the stomach and bowels. In passive diarrhœas and chronic dysentery, after the cessation of inflammatory action, mercury often proves highly irritating or injurious; and even in cerebral affections tending to serous effusion, we must discriminate between the truly inflammatory form and that depending on scrofulous disease, before we have recourse to mercury as our plan of cure. In virtue of its action on the secernent functions, particularly of the lymphatic system and the skin, mercury is often indicated in the child, in whom glandular and cutaneous disease so often exists; but the action which mercury exercises in promoting the biliary and other secretions of the chylopoietic viscera, is not confined to this medicine but shared in common with it, by several of the neutral salts and some of the vegetable purgatives; while in glandular disease having a strumous origin we must use great circumspection in our employment of mercury. The continued morbid irritation of some febrile disorders and the chronic inflammatory characters of others, is perhaps best broken in upon by the use of mercurials; but the abuse of these medicines in the treatment of all febrile attacks, as measles, scarlet fever, small pox, &c. &c., appears justly to have been blamed as accelerating or inducing the development of scrofula, during convalescence therefrom. In confirmed scrofula we must be most sparing in the employment of mercury; or altogether, interdict its use—never, except under the most urgent circumstances, attempting to put the system under its influence—and the same is to be said of scorbutic states of the constitution, especially if attended by hæmorrhage.

In certain conditions of strumous disease, however, assuming the form of ulcerations connected with indurated glands, the alterative action of corrosive sublimate will be found of signal service, both in dispersing the glandular enlargement and disposing the ulcerations to heal, as we often witness in such ulcerations seated in the throat and fauces; and even in the amelioration of mesenteric disease. Employed for this purpose, the bi-chloride must be given in very minute doses, not too long continued at one time, and exhibited in combination with sarsaparilla, which we have found decidedly more eligible than combination with tinctures of rhubarb or bark, as advised by Sir Astley Cooper. Under the use of this medicine, the urine will be found to increase in quantity, and the stools often become of an olive green color.

Underwood claims credit as being the first medical writer to recommend the use of calomel in infantile disease; and doubtless the medical profession is much indebted to the first introducer of so active a remedy; nor should the blame of its abuse attach to him.

III.—SEDATIVES.

Irritation is a usual attendant on infantile disease, which often arises directly from this source; and in all cases, nervous susceptibility to a greater or less degree is present. Hence we are prepared to expect much good from the employment of sedatives, which are often indicated, but concerning the use of which a very general apprehension appears to prevail. This has probably arisen from the injurious, or even fatal results, which have followed the administration of soothing syrups, &c., to young children by ignorant attendants. The ingredients of such compounds, or at least the quantity of narcotic which they contain, are seldom known; so that their employment, even by the regular practitioner, is dangerous, independently of the objection that recommending such, fosters popular prejudice respecting the ignorance or indifference of medical men about infantile disease. Hence the physician should always *formally* prescribe them; and from no class of medicines does more signal service arise, when judiciously administered to the child. The evil effects of the habitual administration of narcotics are soon visible in infants who are subjected to this soothing system: the digestive organs become altogether deranged; the appetite is lost or precarious; the bowels are constipated and evacuations white; the body dwindles, and the face pale, shrunk, and sallow, with eyelids red and swollen, presents, in its stupid aspect, an appearance not to be mistaken. When called upon to treat such children, it is necessary to keep in mind, that however injurious this practice, it is one that cannot with impunity be at once discontinued, as extreme irritability of the nervous system, accompanied by spasm and convulsions, will follow, if the accustomed sedative be not gradually withdrawn.

Opium acts with much energy and rapidity, particularly within the first few months after birth, and due caution must be exercised in prescribing it. But when once the proper dose with which to begin is known, and we are aware of the quickness with which it acts, and the length of time during which its influence lasts, we can avoid the danger of an over-dose, or one too frequently repeated. Conditional orders should always be given to suspend the medicine, while the child sleeps, or until the symptoms have returned. The infant frequently begins to slumber immediately on the administration of the first dose of the medicine, and continues to sleep for several hours,—the effect lasting from four to five hours, or more, at a time. Hence an opiate should not be renewed oftener than every third or fourth hour,—twice or thrice a day being in general sufficiently often. In some cases, however, it may be required so often as every hour, or half-hour, until the desired result is attained, as in severe cholera, but its effects must in such cases be narrowly watched. The influence of opium is more immediate and remarkable when the tincture of opium, or the pulvis cretæ comp. c. opio, are exhibited, than the syrup of white poppy, or Dover's powder, though the doses be equivalent. Syrup of poppy is generally preferred as the opiate for children; but it is uncertain in its strength, being liable to spoil or be adulterated. When genuine and well-preserved, one ounce is considered equivalent to a grain of opium; so that thirty drops, or half a tea-spoonful, would be equal to 1-16 of a grain of opium, or about a drop of laudanum; this would be the dose for a child five or six months old. During the first two months, we would not advise more than ⅛ or ¼ of a drop of laudanum to be given at once until the effect was tried,—even this minute quantity occasionally producing more of a narcotic effect than might be anticipated, or would be caused by a larger proportionate dose of syrup of poppy. The best and safest form for exhibiting opium to the young infant is by diffusing a given quantity of laudanum in a mixture with simple syrup, so that the dose will be always definite, however minute, as in the following formula, which we name the simple sedative syrup.

No. 1.

Syrupus Sedativus Simplex.

℞

Aquæ Distillatæ ℥i
Mucil. Gum. ac. ℥ss
Syrupi Simplicis ℥ss
Tincturæ Opii guttam.

M.

A tea-spoonful will be the dose, repeated every half hour till rest be procured; but after the first month, double that quantity may be begun with. At the third month, half a drop of laudanum may be given for a dose,—one drop at six months old, and two after the first year.

The camphorated tincture of opium presents a preparation with more of sedative, and less of narcotic properties than the simple tincture, and also of weaker strength; so that it may be given in triple the quantity, and is preferable to allay spasm and quiet irritability, especially when connected with cough. The same may be said of the ammoniated tincture, which is best added to a carminative mixture, when we want to allay pain or spasm caused by flatus; the dose being double that of laudanum.

The sedative influence of lettuce or orange-flower water points them out as eligible vehicles; and laurel water is a sedative peculiarly serviceable in allaying pain, spasm, or convulsion, arising from intestinal irritation in the child. Hence we propose another sedative mixture, to be called the compound sedative syrup.

No. 2.

Syrupus Sedativus Compositus.

℞

Mucil. Gum. ac. ℥ss
Aquæ Lactucæ ℥i
Aquæ Lauro-cerasi gtts. viii
Syrupi Aurantii ℥ss
Tincturæ Opii guttam.

M.

If we wish to obviate costiveness while employing this mixture, from one to two drachms of which may be given every second or third hour, syrup of violets may be used instead of simple syrup, or a drachm of rhubarb wine added. If, on the contrary, we wish to check diarrhœa, allay pain, or remove flatulency; aromatics, alkalies, or astringents may be combined.

Dover's powder is a mild and safe opiate for the child, and less liable to disagree than perhaps any other. From ¼ to ½ a grain may be given at a dose, during the first three months; and from one grain to two, after a year old. The compound powder of chalk with opium acts more energetically, and must be used with greater caution. The very small quantity of opium present, however, enables us to give it apparently more freely: from half a grain to a grain will be borne during the first six months, and two grains after that period, three times a day, or four grains by a child two years old.

Narcotics readily produce their effect when applied to the skin of the child, and require proportionate caution when thus employed, so delicate and susceptible is the cutaneous surface. In this manner, tincture of digitalis is often used in continental practice; and opiate plasters are found most serviceable in protracted bowel complaints; while an English physician, Dr. Bow, extols the use of opiate frictions in the inflammatory affections of children. The form he employs is as follows; and he relates many cures effected in this way.

No. 3.

Dr. Bow's Opiate Liniment.

℞

Opii ʒi
Saponis ʒss
Linim. Camph. comp. ℥i

Digere per dies aliquot et effunde linimentum.

Sleep being almost as essential to the child as food, we can scarcely fail to benefit it by inducing a state of rest during illness, and this the use of opium seldom fails to do. Many alarming symptoms, as screaming, spasm, or convulsion, may be thus mitigated, or at once removed, if dependent on irritation alone. When using narcotics for such a purpose, however, we should examine into the cause of irritation, and try to remove it, while we palliate the symptoms,—as, for example, by dividing the gums, or freeing out the bowels, if required; and in inflammatory cases, depletion should always precede or accompany the use of sedatives. After blood-letting, opium appears to possess, in some instances, a distinct influence in controlling inflammatory action, more especially when seated in a serous membrane. In cerebral irritation, or in meningitis, after depletion, the beneficial effects of an opiate in procuring rest and tranquillity is often very remarkable; but in this case judgment and experience are particularly required, as cerebral irritation is very liable to pass into congestion in the child, and inflammation to end in effusion; and the narcotic effects of an opiate would tend to obscure or aggravate the symptoms, and might increase the liability to congestion. The irritable or spasmodic character which often belongs to the cough or breathing, in the pulmonary affections of children, is generally mitigated, and at times removed, by the use of an opiate; and some tincture of opium, or Dover's powder, is a useful adjunct to expectorant medicines, which are also better borne by the stomach when thus combined.

In all cases of gastric or intestinal irritation, whether sympathetic or not, opium is a chief resource, and must in severe cases be administered in a decisive manner. An injection containing one, two, or three drops of laudanum, according as the child is three, six, or twelve months old, will often at once check a diarrhœa which had lasted long, and been in vain treated otherwise.

IV.—ALKALIES AND ALKALINE EARTHS.

These exert a decided sedative influence, especially upon the mucous membranes, when in a state of irritation or chronic inflammatory action; while they, at the same time, alter and improve their secretions. Their antacid properties, in addition, render them peculiarly eligible in the treatment of infantile disease; and we have often experienced their utility, more especially in controlling gastric or intestinal irritation. The stomach may be thus often quieted, and many of the more distressing attendants on diarrhœa or dysentery removed. They mitigate pain and spasm, appearing to restore or equalize the peristaltic motion. Tenesmus is often speedily removed by the use of one of these alkalies, and the character of the stools altered, their fetor being destroyed. In pertussis, or in spasmodic cough, they tend much to mitigate the severity of the symptoms; and in the advanced stages of bronchitis, the alkalies, in addition, exercise an influence over the morbid action, causing the phlegm to be less viscid, and consequently more easily excreted. In prescribing these medicines, however, we must not employ them in the early stages of inflammation, and we must be careful to exhibit them sufficiently diluted or guarded by some mucilaginous menstruum. Combination with opium, or its alternate use, adds much to their efficacy, and is frequently adopted.

According to the object in view, will we combine, or select the alkali we would employ. In general, the bicarbonates are preferable to the carbonates, as being less caustic; and, for this reason, carbonate of soda is preferable to carbonate of potash, as well as because it is not deliquescent, and therefore may be given in the form of powder; but these objections do not apply to the bicarbonate of potash, which should therefore be preferred to the carbonate, and is altogether the most eligible of these alkalies for ordinary use.

When the stomach is very irritable, the liquor of potash, or lime water, will often answer best, or magnesia, if the bowels be confined. When the bowels are irritable, chalk in the form of pulvis cretæ compositus, with or without opium, is usually selected; or chalk mixture instead. Where the stomach is at the same time irritable, however, carbonate of lime will not be borne; and we choose carbonate of soda, or better, bicarbonate of soda or potash. If much flatulency be present, with acidity, any carbonate is objectionable: the additional extrication of gas, caused by its decomposition, adding to the distress and oppression. A few drops of liquor of ammonia, or of its aromatic or fetid spirit, will answer best in this case—often putting an end at once to the flatulency, as well as acidity, by its stimulant and alkaline properties. Should the action of a stimulant be objectionable, *calcined* magnesia should be preferred. Liquor of potash, in particular, exercises an influence on the glands and skin, diminishing irritation and its consequences, when seated in either of these structures, especially if connected with morbid states of the primæ viæ, as is so often the case. Enlargement of the glands of the neck, groin, and even mesentery, we have seen diminished under its use, when iodine could not be borne, or as a medicine introductory to its employment; and in those forms of cutaneous disease more directly connected with derangement of the digestive organs, the useful effects of this medicine are most remarkable. In employing this class of medicines, however, we must occasionally interrupt their use; as too protracted a course is liable to debilitate the stomach and otherwise derange the digestive organs.

V.—CARMINATIVES.

A stimulant action is often looked to as a principal agent in restoring the mucous membrane to a healthy tone. For this purpose, an aromatic stimulant is usually preferred, and some of the distilled waters, or a few drops of an aromatic oil, diffused through the mixture selected. Indeed, with some, no medicine is prescribed for a child, without the intervention of dill or fennel water; but this is objectionable, when unnecessary, as their strong odor is always offensive, and adds much to the disgust for medicine. To all these aromatic waters is attributed an anti-flatulent or anti-spasmodic action; but to some, peculiar properties are ascribed. Thus mint water is selected when the stomach is irritable; but in such cases the simple compound infusion of mint, or fresh mint tea, is preferable. Cinnamon water is chosen when the bowels are the seat of irritation. On such principles are constructed the carminative mixtures so commonly given to children when affected with gripings, acidity, flatulency, or convulsions; and when these arise independently of inflammatory action, those mixtures are often of great utility. But we must be careful to avoid stimulants when such symptoms are connected with inflammation of the stomach, bowels, or any other organ.

The most celebrated compound of this description is Dalby's carminative, the prescription for which we give in a note;* but some of the following formulæ, which are more simple, will be found convenient:

No. 4.

Mistura Anti-emetica.

℞ Infusi Menthæ ℥i
Mucil. Gum. ac. ℥ss
Syrupi Aurantii. ℥ss
Spir. Lavandulæ c. ʒss
Tinct. Opii gtts. ij M.

ʒi—ʒij sumat horâ quâque 2dâ.

In irritability of stomach, with flatulency and acidity, or diarrhœa, when much griping or spasm is present without inflammatory action, the following mixture is to be employed; to which a drachm of tincture of rhubarb can be added to insure a purgative effect, if desired:

No 5.

Mistura Carminativa.

℞ Aquæ Carui ℥i
Mucil. Gum. ac ℥ss
Magnesiæ Carbonatis ʒss
Olei Cajeputi gtts. iv
Syrupi Croci ℥ss
Spir. Ammoniæ Fœtid. ʒss M.

ʒss—ʒij sumat ter indies.

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* *Dalby's Carminative.*

℞ Aquæ Menthæ Piperitæ ℥ii
Carbonatis Magnesiæ ℈ij
Olei Menthæ guttam
—— Anisi guttas iii
Tincturæ Castorei ʒss
——— Cardam. Comp. ʒss
——— Assafœtidæ gtts. xv
Spiritus Pulegii gtts. xv
Tincturæ Opii guttas v M.

The stimulant effect of this mixture can be increased, when depression attends, by the addition of half a drachm of compound spirit of lavender, or one scruple of nitrous spirit of ether, or Hoffman's anodyne liquor. In flatulent colic, half a drachm of the ammoniated tincture of valerian will make a preferable addition; or four drops of laudanum may be added when an anodyne effect is desired.

VI.—STIMULANTS.

Much caution is required in administering stimulants to the child, as excitement is easily induced, and consequently the depression often attendant on local disease increased, instead of being diminished. Great mischief is thus done by the improper administration of stimulants to infants, to whom they are commonly given to expel flatus, allay pain or spasm, and throw out eruptions, or stimulate the child when thought to be debilitated during the progress of inflammatory affections, particularly of the alimentary canal. When exhibited in such cases, all the symptoms become aggravated; and yet their use is often persevered in to the last.

We must not fall into the popular notion that the diseases of children arise from debility—an error of which even Sydenham seems to have partaken, often prescribing ammonia in infantile disease; but when we do find infants habituated to the use of stimulants, it will be necessary to exercise due discretion in subjecting them suddenly to the depressing influence of a lowering plan of treatment.

When a stimulant is required, as in cases of sudden sinking or much depression, such as attends severe vomiting and purging, the volatile alkali is one of our best for children, being quick and transient in its action, not likely to disturb the head, or give rise to continued excitement, as alcoholic preparations do. Hence aromatic tinctures, wines, &c., should seldom be given to the infant; but the aromatic waters, volatile oils, or some of the milder aromatic spirits, may be commonly employed as vehicles or adjuncts.

During the course of the eruptive fevers, when the eruption has receded, or come but scantily out, some stimulant may be required; and when these fevers assume the typhoid type, stimulants must be employed; but their universal use in measles, small-pox, &c. &c., as practised by some, cannot be too strongly reprobated.

In dyspnœa dependent on debility and spasms, or occurring in the advanced stages of pulmonary catarrh, from accumulation of phlegm in the bronchi and inability through weakness to expel the same, stimulants must be employed, and the aromatic spirit, or carbonate of ammonia, combined according to the circumstances of the case, is perhaps the best we can prescribe.

When restlessness, spasm, or convulsions, arise from exhaustion, as in cases where depletion has been carried too far, or illness has been long protracted, a stimulant is most beneficial; but if used as an anti-spasmodic where such symptoms arise from an opposite cause, as they more frequently do, an aggravation of every symptom will be induced.

The following will be found a good general stimulant for the child:

No. 6.

Mistura Excitans.

℞

Aquæ Menthæ ℥iss
Spir. Ammoniæ arom. ʒss
Spir. Ætheris nitrosi gtts. xij
Spir. Lavandulæ Comp. ʒi
Syrupi Simplicis ℥ss

M.

ʒi horâ quâque secundâ.

Turpentine, as a stimulant and anti-spasmodic, is peculiarly adapted for children—one or two drops often at once removing flatulency or spasm. In protracted diarrhœa, its action is most serviceable: and it has also anthelmintic powers, which recommend it in particular cases.

The following formula will be found convenient:

No. 7.

Mistura Terebinthinata.

℞

Aquæ Anisi ℥i
Mucil. Gum. Ac. ℥ss
Olei Terebinth. rec. ʒss
Olei Limon. volat. gtts iv
Sirupi Simplicis ʒiv

M

ʒi—ʒij horâ quâque tertiâ.

VII.—TONICS.

Children often require tonics during convalescence, or in the advanced stages of inflammatory and febrile disorders; but they must be tried with caution, and used very moderately, as they are much more liable to induce excitement than in the adult. A principal object in giving tonics to the child is to restore appetite, as when once that is established, strength will soon be renewed by the use of nutritious food. For this purpose any of the simple bitters or sulphate of quinine, may be used. The infusions of cascarilla, columba, gentian, hop, or chamomile, diluted with equal parts of an aromatic water, and given in doses of two drachms or half an ounce, twice or thrice daily, appear to be the bitters best adapted for the child; but sulphate of quinine may be looked on as a substitute for all, and in sufficiently small doses can be given to the youngest infant, as in the following formula:

No. 8.

Mistura Corroborans.

℞
Aquæ Distillatæ ℥iss
Quinæ Di-Sulphatis gr. ij
Acidi Sulphur. arom. ℈i
Tinct. Aurantii ℈ii
Syrupi Aurantii ʒiii
M.

Capiat ʒi—ʒij ter quaterve indies.

Bark and steel are the best tonics we possess, and those most calculated for general use—bark is to be preferred for making a sudden impression in cases of urgent debility or attacks assuming a distinctly intermittent or periodic form; steel for its more gradual influence in protracted cases, or those merely remittent in their type. A combination of both will be found more serviceable than either singly, when debility is dependent on a cachectic state of the system, and spasmodic or other attacks assume a periodic form. In such cases, a grain of sulphate of quinine and a grain of sulphate of iron, dissolved (by the aid of six drops of dilute sulphuric acid) in two ounces of infusion of columba, (as recommended by Dr. Cheyne,) will be found an excellent combination, and may be given in doses of two drachms to half an ounce, twice or thrice a day; or we may at once prescribe, in similar doses, the mistura ferri aromatica of the Dublin Pharmacopœia. The combination of quinine and iron in the form of citrate is perhaps the best and most agreeable preparation of this kind.

Iron and iodine are tonics of peculiar power, especially in the treatment of scrofula, and hence, often employed in infantile medicine. Their efficacy in restoring appetite, when properly administered, is remarkable, particularly so with iron, which also possesses the property of improving the quality, if not of increasing the quantity of the blood, so as to add color to the cheeks, while it gives strength to the frame; and is altogether the best tonic we can employ in convalescence, after much blood has been lost during illness; or in cases of relaxed fibre and general debility, in consequence of its astringent as well as tonic powers. Iodine is not so uniform in its beneficial effects upon the appetite, which it appears occasionally to derange rather than augment; and this result has been estimated to occur in about one case out of six. When its use is too long continued, an irritable state of the intestinal mucous membrane is liable to be induced, and then colicky pains, griping or purging with febrile excitement will follow; as also if the medicine is given during the existence of gastric irritation; but in such cases, its use must be abandoned or suspended, as must that of all tonics, when excitement or fever attend their administration.

The tartrate of iron is altogether the best preparation for children, and that generally employed, both on account of the absence of taste, and the mildness of its action. In addition to its tonic properties, it joins a tendency to open the bowels: and this effect may be heightened, and its taste quite hidden, by combination with treacle. When it is an object to increase the aperient action, this may be done to any extent by joining it with Rochelle salt, or tartrate of potash. And if in addition, or instead, a diuretic action be desired, as in cases of œdema attendant on debility, we may add to the foregoing salts or substitute therefor, the bitartrate of potash. Tartrate of iron may be given in the form of powder, combined with an aromatic, and sugar, as in the following formula:*

No. 9.

Pulvis Chalybeatus.

℞

Ferri Potassio Tartratis gr. ij—gr. v
Pulveris Aromatici
Sacchari Albi â â gr. ij

M.

Sumat pulverem talem ter quaterve indies.

Or a similar combination may be given in the form of bolus, and the dose of the tartrate carried so far as ten or twenty grains, three times a day, in children three or four years old, when much debilitated by protracted strumous disease. In the vinum ferri of the Pharmacopœia, we have a similar preparation in the liquid form, which may be given to the youngest infant in doses of from five to twenty drops, twice or thrice a day; or be carried to drachm doses, when given to more grown children. In a similar manner we may give a tincture made of acetate of iron, which is more active than the last preparation, but not so energetic as the muriated tincture. Asses milk or whey make good vehicles, and assist in disguising the taste; but in cases of much relaxation, conjoined with debility, the muriated tincture, in doses of five or ten drops, given several times a day, and largely diluted, makes a most powerful chalybeate preparation, uniting a strong astringent with a tonic power. Conjunction with muriate of lime or baryta adds to its efficacy in cases of scrofula, for which it is occasionally necessary largely to prescribe it.

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* When thus prescribed, we must point out the Pharmacopœia according to which the preparation is made, as that of the Dublin College is so deliquescent as not to admit of being exhibited in this form.

Combination with muriate of ammonia (ferrum ammoniatum) presents the advantage of uniting the deobstruent properties of this salt of ammonia, with the tonic power of the muriate of iron, so as to temper the action of the latter, and render this compound one of the mildest and most useful chalybeates we can administer to the child. It is admissible during a state of vascular excitability, in which other preparations of iron would not be borne; and is given with the best advantage in cases of glandular enlargements connected with abdominal obstruction, and an atonic state of the mucous membranes. It is well, before administering this or any other chalybeate, to get the secretions into a favorable state by the exhibition of suitable aperients; or the ferri ammonio-chloridum may be joined with such, as rhubarb or taraxacum. When our object is to abate the activity of iron to the utmost, so as to render it least liable to heat the skin or confine the bowels, and thus enable us to take advantage of its tonic power at the earliest period after febrile or inflammatory complaints, the best combination of this kind will be made by joining tartrate of antimony with tartrate of iron; two parts of antimonial wine being added to one of iron wine, and given in scruple or half drachm doses, in white wine and water, three or four times a day, as advised by Tortuel. From one to two grains of the ferrum ammoniatum may be given to infants, twice or thrice a day, and double the quantity to children three years old. The dose of the tincturi ferri ammoniati is from five to thirty drops. This preparation is, in particular, recommended in rachitis, but there are, perhaps, good reasons why the phosphate of iron should, in such cases, have the preference.

The carbonate of iron is a mild and efficacious preparation, resembling iron filings in action, though not possessed of equal anthelmintic virtues, but more convenient for administration to the child, as not being attended with fetid eructations, and appearing to possess particular efficacy in some spasmodic affections, or those accompanied with periodic pains. To be useful, however, it must be recently precipitated, or still moist, as in the mistura ferri composita—an active, but disagreeable form for its exhibition. The ferri carbonas saccharatum of the Edinburgh Pharmacopœia, is an eligible form for exhibiting this medicine to children, but must be given in large doses, from ten grains to half a drachm. When prescribing iron in the form of carbonate, it is well to add some grains of a bicarbonate, which will, in general, aid the objects of the medicine, and always help to preserve it from chemical alteration. Citrate of iron, which can be given so agreeably in lemonade, is peculiarly eligible for the child. Sulphate of iron, the most irritating but powerful of the chalybeate salts, ranks high for its anthelmintic virtues and astringent powers, checking secretion and excretion; but is so liable to disorder the stomach, as to be unsuited for very young children; and even for those more grown, it should be ordered only in cases of extreme relaxation and debility, accompanied by profuse discharge, when its free exhibition will often be attended with the happiest results. The disturbance which iron occasionally causes to the head, is said to be best removed or obviated by the use of camphor, which may be given to the child suspended in milk: but we must keep in mind that camphor is liable to disagree with children, causing dyspnœa and nervous agitation. The best time for administering either iron or iodine is about two hours after a meal, when the stomach is not too full nor yet empty; and its use should be suspended occasionally during a course, stopping every three weeks or month for a week or fortnight. In this way steel may require to be repeated for years, when the object is to rectify the constitution in delicate strumous children.

Iodine, in the form of tincture or hydriodated solution, can be safely administered to the youngest child. From one to five drops of either preparation may be given at a dose, in some sweetened water; but sugar should not be added until the dose is about being taken, as decomposition would otherwise occur; and distilled water alone should be ordered for the solution of iodine. The tincture, when recent, is precipitated on being added to water; but this does not occur when it has been some time kept; and it is altogether one of our best preparations of iodine. For external use, at all events, it is a milder application than the compound tincture, or hydriodated solution in alcohol, which is now substituted for it in the London Pharmacopœia. The following aqueous hydriodated solution nearly resembles that proposed by Lugol, and may be administered in a similar manner; but the dose can be carried much farther than Lugol ventures, if we are only careful sufficiently to dilute the medicine, and occasionally to intermit its use.

No. 10.

Solutio Iodinii Hydriodata.

℞

Aquæ Distillatæ ℥ij
Iodinii gr. v
Hydriodatis Potassæ gr. x
M.

Baudelocque found that irritation of the stomach was induced, when the proportion exceeded one-eighth of a grain of iodine, and one-fourth of a grain of hydriodate of potash, to an ounce of water, but with proper precautions, a grain of iodine, and two of the hydriodate may be given in the day to a child from four to seven years old, and double, or even treble these quantities after that age; so that the dose of the hydriodated solution may be carried to half a drachm, or a drachm, twice or thrice a day—beginning, however, cautiously, with only a few drops at a time. But the hydriodate of potash is altogether the safest preparation, and may be given with safety even to young infants, in very large doses. Union with starch deprives iodine of its acrimony, (as has been observed by Dr. A. Buchanan,) and barley water presents us with a vehicle for extemporaneously effecting this compound—its amylaceous properties causing the immediate formation of an iodide of starch, indicated by change to a blue color on the addition of iodine; of which it will be well to give warning to the attendants beforehand. To obviate, in particular, the sense of oppression or uneasiness of the stomach, sometimes caused by iodine, wine of bark is said to be the best adjunct we can employ.

The combination of iodine and iron, presents particular advantages, and, in some of the more protracted forms of strumous cachexy, the administration of iodide of iron affords benefit which perhaps no other medicine does. Such combination may be extemporaneously made by adding from three to ten drops of muriated tincture of iron to the same quantity of the hydriodated iodine solution, (as given above,) or the compound tincture, and administering this dose in sweetened water, or barley water, twice or thrice a day. Quinine and iodine may also be combined, and their union forms a medicine possessed of absorbing powers peculiarly fitted to the treatment of glandular enlargements and suppurations in scrofulous children of lax fibre, and subject to febrile attacks of the remittent or intermittent kind. Dr. Kingdon, of Exeter, has formed a combination of this kind, which may be given in doses of ¼ or ½ a grain, twice or thrice a day, to children from one to five years old.

The external application of iodine is of not less importance than its internal administration, in the dispersion of glandular enlargements, healing of scrofulous ulcerations, or even the removal of unsightly scars. Ioduretted ointments are generally employed for this purpose, but the simple tincture is a more convenient preparation for general use, and may be applied to ulcerated surfaces and cutaneous eruptions, as well as to the unbroken skin. It is in particular useful in those ulcerations within the mouth or nostrils, which often prove so intractable in young persons. The sense of burning heat, or pricking, which occasionally attends these applications, soon wears off; and as the ulcer heals, the surface becomes altogether insensible to the irritative action of the medicine.

The union of iodine with mercury presents a powerful combination, but we should hardly venture to order such extemporaneously when prescribing for a child; for although mercurial ointment, or blue pill, may be joined to iodine with impunity, the presence of even a small portion of hydriodate of potash will create an irritating compound, highly dangerous either for external or internal use. It is better to prescribe mercurials antecedent to iodine, or to alternate their employment; which may often be done with advantage, as by improving the secretions and unloading the bowels, we prepare the system for the influence of the iodine.

In cachectic states of the system, such as we often see in children who have been neglected or mismanaged, iodine is most useful as a stimulating tonic, especially if unhealthy inflammation, or ulceration, tending to sloughing, be present, as in pemphigus, &c. In glandular enlargements, which occur so generally at a young age, it is unnecessary to point out the utility of iodine; but we should keep in mind that children are in particular obnoxious to the evil effects of this medicine. For a good account of iodine as applicable to infantile disease, see Dr. Ure's Practical Materia Medica, which we here refer to, once for all, as a valuable compendium of infantile therapeutics; our own limits not allowing us to enter more minutely into the uses of individual medicines.

Among remedies exercising an alterative and tonic effect, the cod liver oil (oleum jecoris aselli) is one of the most remarkable, and which has lately been restored to much medical confidence. Its influence is most manifest in children of lymphatic temperament; and many scrofulous affections are benefited by its use. The strength is augmented, and, above all, the powers of nutrition restored, so that flesh is quickly gained. The emaciated and feeble child becomes plump and strong, while its local disorder is ameliorated or removed. It is in scrofulous affections of the bones and joints that its action is conspicuous, as also in mesenteric disease; but this beneficial influence is not seen in enlargement of other lymphatic glands besides those of the abdomen. In advanced cases of tubercular consumption we must often be disappointed in the effects of this oil, as of all other remedies; but we have seen remarkable recoveries under its use, in chronic affections of the lungs in scrofulous children. The quantity given should vary from one table spoonful to two in the day; and, though very nauseous, children take it well on hot milk.

VIII.—ANTIPHLOGISTIC PLAN OF TREATMENT.

The class of remedies which we shall have most occasion to use in the treatment of infantile disease, is that which is employed to combat acute inflammation; and hence called antiphlogistic. These remedies act principally by depletion, or as evacuants; but we must not forget that a certain part of their action is stimulant,—specially exciting some organ or tissue, as the kidneys or skin, and so producing a diuretic or diaphoretic effect. This is most manifest in the case of cathartics, which often irritate the bowels, as well as purge, thus acting more or less as counter-irritants, some of their remedial power arising from this source. This action may, however, be carried too far, so as to do injury by the special irritation thus produced, which may also prevent the expected evacuation, and aggravate, or even create, local inflammation. Much mischief arises from overlooking these circumstances in the treatment of children's diseases; for in consequence of the susceptibility of their organs, this irritative action is peculiarly liable to be carried to an injurious degree. Thus it is that we see intestinal irritation induced by purgatives continued to be given to children, until nothing but a little bloody mucus is evacuated; or stimulating expectorants employed, until expectoration has been suppressed, and a slight catarrh changed into a severe bronchitis.

These errors we shall avoid by recollecting that the use of evacuant medicines is not necessarily followed by evacuation, as their names (purgatives, diaphoretics, &c. &c.) would imply, unless the necessary precautions be taken to ensure such results. These are, to employ only the least stimulating in the early stages of inflammatory diseases, and to premise direct depletion when required.

IX.—BLOOD-LETTING

Is the first step in the antiphlogistic plan of treatment, and the most powerful, not only in subduing inflammation, but in insuring the beneficial results of the other remedies; most evacuants acting with more speed and certainty when blood-letting has been premised. In the child, more particularly, bleeding is required in the first stage of all acute inflammations. It may be practised with safety in the youngest infant, provided we hold in view the relation between the necessities of the case and the strength of the patient—the only true rule applicable to depletion in old or young. Repetitions of blood-letting are not well borne by the child. Dr. Clarke justly states that very young children, although they bear so well one or two full bleedings, but ill endure a further repetition of blood-letting, and hence an additional reason for its prompt employment when necessary.

In all cases of inflammatory or febrile affections in the child, our first consideration should be—is it necessary to bleed? And it will be necessary in most severe cases, not only for the purpose of mitigating the malady and rendering it more amenable to medical treatment, but as our chief means of, at once, arresting the disease. When inflammation is seated in the substance of any organ, or in a serous membrane, bleeding is the more necessary—less so, if only a mucous membrane be affected. But the necessity again becomes urgent, when membranous and parenchymatous inflammations are united, as we see in the broncho-pneumonia of infants—a frequent and fatal disease of childhood, for which full blood-letting is indispensable. In croup, again, although only a mucous membrane be affected, the importance of the organ implicated, and the peculiar character of the inflammation, demand prompt and free blood-letting; but before deciding on this measure, we must be careful to distinguish between truly inflammatory croup, and those affections of the trachea, which originate in the extension of ulceration or exudation from the fauces or pharynx; or the purely nervous affection, denominated spasmodic croup. So in affections of the head, while we employ blood-letting largely in decided cerebral inflammation, or when determination of blood to the head is clearly manifested in convulsive affections, we will be reserved in its use in the more ordinary cases of inflammatory action, which is of a low or asthenic form, such as usually occurs in scrofulous children, and constitutes the greater number of cases commonly denominated hydrocephalus; while in cerebral irritation arising from exhaustion, and often seen antecedent to coma or convulsions, as well as in those affections when originating in the same cause, blood-letting, however much it may seem called for, to the uninitiated, must be altogether forbidden. In inflammatory affections of the intestinal mucous membrane, abstraction of blood, although necessary, is but moderately required; and before employing this remedy we should make sure that inflammatory action is present, nor take every instance of vomiting or purging, even though accompanied with abdominal sensibility, for a case of gastritis or enteritis. In the febrile affections of children when symptoms run high, a timely bleeding will often prove a preventive measure, by curtailing the duration of the fever and sparing the necessity for protracted use of other evacuants: thus best preserving the strength, as we have often witnessed even in cases of remittent fever. In the eruptive fevers, however, although the urgency of febrile symptoms in the first instance, or the occurrence of local inflammation subsequently, may render necessary the abstraction of blood, this must always be done with reference to the necessary continuance of a disease, which having a course to run, cannot be cut short; and is liable, in its progress, to assume a typhoid or asthenic type. In symptomatic affections, as when the head becomes engaged during the existence of abdominal disease, blood-letting, although required, should not be carried to the same extent, as in a primary affection. During dentition, when so much increased vascular action as well as nervous sensibility is present, bleeding may be practised more freely than under ordinary circumstances; while in scrofulous disease, on the contrary, or in children of a highly strumous constitution, blood-letting should be employed with the utmost reservation that the nature of the case will admit, so unwilling should we be to diminish from the red blood circulating in the system.

In the infant, or young child, we can seldom draw blood from the brachial veins, which are usually small and obscured by fat. We can generally, however, procure as much as we require from a vein on the dorsum of the foot, or back of the hand, or, when these fail, from the jugular vein. The latter might be often opened in inflammations of the head or chest, with peculiar advantage, on account of its vicinity to the disease; but it is sometimes difficult to stop the bleeding, and the employment of a bandage is here badly borne, especially when the respiration is affected. The brachial veins, after the period of first dentition, become in general sufficiently well marked to allow of their being readily opened, unless the child be very fat. Leeches, however, can always be applied, and will take a sufficiency of blood to answer all the purposes of general bleeding. The quantity of blood obtained by one good leech, allowed to bleed for half an hour, may be estimated at one ounce; while this method has the advantage, from the gradual manner in which the blood flows, of not being liable to induce sudden collapse in young children. The safest place for their application is the hand or foot, as we can then ensure stoppage of the hæmorrhage at any moment, by the use of a compress and bandage. When applied in other situations, as the chest, or throat, leeches have led to fatal results by a continuance of hæmorrhage. They may, however, in affections of the head, be safely placed over the mastoid process, and, occasionally, in those of the throat or chest, over the clavicles, as we then have a firm point of resistance upon which to make pressure, should they continue to bleed.

Great difficulty is at times experienced in commanding the hæmorrhage from leech-bites; whether from the greater redundancy of blood in the capillary circulation of the child, the less liability of this fluid to coagulate, or the want of tone in the vessels consequent on loss of blood and preventing their contraction. However this be, fatal results have frequently arisen from this cause, and the physician should never omit giving the necessary cautions on the subject, nor neglect himself to see that the bleeding is arrested before quitting the child for the night. Indeed it is as well to avoid, if possible, ordering leeches to be applied to children late at night. When simple exposure to the air or compression by means of the finger and a dossil of lint fail in restraining the hæmorrhage from the bites of leeches, which have been placed in a situation forbidding the use of a bandage, we must dust the part with some dry powder, as starch or gum arabic, or, if this fails, press a fine pencil of lunar caustic into the wound. The actual cautery may be required, as touching the bite with a red hot wire or knitting needle; or we may pass a needle and silk thread through the sides of the wound and close it by knotting the ends together, as recommended by Dr. M. Hall; or in the way employed in securing the vein of a horse, in which manner also the jugular vein can be secured when ordinary methods fail.

Cupping is a more definite and manageable mode of abstracting blood than leeching, and may be practised even in young children, if skilfully performed. The nape of the neck or interscapular space, present the best situations, being sufficiently large in surface and out of sight, so as to cause least alarm to the child. The quantity of blood to be taken, must of course, be determined by the urgency of the symptoms. It should be always drawn from the child in the erect posture, and be sufficient to make an impression upon the system—of which we judge best in the child by observing the colour of its lips and cheeks; the former especially quickly indicate the approach of faintness, by the paleness which they assume, and are a much better guide than the state of the pulse, which is very variable.

In cerebral affections in particular we must be guided rather by the condition of the vessels about the head, than the state of the pulse at the wrist, which may be small or appear feeble, while the carotid or temporal arteries are full and throbbing. As a general estimate of the absolute quantity to be removed at one time, we may say, that during the first year, from an ounce to three ounces of blood, (or the application of two or three leeches,) will be sufficient; and, after the first year, we may usually take an additional ounce for each year of the child's age, seldom having occasion within the period of childhood to exceed eight ounces of blood, or to apply more than twelve or at most sixteen leeches. We have noticed the caution necessary to be observed in employing repetitions of general blood-letting. The necessity for this will be much lessened, and the efficacy of the general blood-letting greatly enhanced by quickly applying leeches over the part inflamed, or in its near neighborhood, so as to keep up the impression made on the system, and while the general circulation is yet enfeebled, thus directly to deplete the affected organ. A second employment of blood-letting, if required, should seldom be had recourse to before the lapse of twelve or sixteen hours; but by this method it may often be avoided. Dr. Mills lays much stress on this mode of using leeches in affections of the head in children; but it is a practice of general application, and we suppose always adopted by the judicious physician. It must also not be forgotten that the ill-fed and enfeebled children of the poor, will not bear bleeding to the same extent, nor require it so often as those of the more wealthy classes. When a child has been blooded too largely or too frequently, an alarming state of collapse may be suddenly induced, the system not possessing in early infancy much power of rallying from such depression. In this state of deficient power of reaction, the child will be observed to become extremely pale, even the color of the iris may change, and present a paler tint; the extremities are cold, pulse feeble and frequent, breathing hurried or rattling, the respiration appearing to be performed almost solely by the diaphragm, and accompanied by much evolution of flatus. The child becomes irritable, agitated and wakeful, and should depletion be persevered in, or suitable remedies (stimulants or sedatives) not be employed, coma or convulsions ensue; the powers of life sink, and the child dies from exhaustion, passive exudation taking place into the ventricles of the brain. We have seen such cases, and Dr. Ure notices the unexpected occurrence of such symptoms in children apparently strong, and to be accounted for only on the supposition of a peculiar idiosyncracy, derived from a delicate and highly sensitive mother. At all events we should be on the alert immediately to arrest the bleeding when any such symptoms appear; and, as a general rule, it is well to stop the flow of blood when decided pallor takes place, without waiting for actual fainting, which does not readily occur in young children, and from which they do not quickly recover. The more ordinary and less urgent evils attendant on over active sanguineous depletion, are the reduction of a child to a state of anemia, in which the strength fails, although the appetite may continue or increase; the child becomes very fretful, wakefulness alternating with stupor; passive diarrhœa is established, or more generally dropsical effusions take place. The buffing of the blood is not a safe guide in the child, as we have diseases absolutely requiring bleeding (e. g. croup, bronchitis, &c.) which seldom produce in the blood the appearance in question; and it is even said to be more generally absent when inflammation is present, while it may be seen where none exists or only in a very slight degree.

X.—BLISTERS

Are much employed in the treatment of inflammatory affections in children, and when judiciously used, are signally efficacious; but, as they induce much local and constitutional excitement, very injurious consequences follow their improper application. Hence, blisters should never be used in the early stages of severe inflammations, as a substitute for bleeding; nor should they even follow soon after the employment of this remedy, unless a decided impression is made on the local disease and fever—otherwise, both will be aggravated by the effects of a blister; and we have had occasion to order repetitions of bleeding, which would not have been requisite, had not acute symptoms been renewed in this way. We, therefore, altogether reprobate the popular practice of at once applying a blister to the throat or chest on the first appearance of croup or cough in the child, and equally interdict the very early or direct application of blisters, in which some practitioners are fond of indulging. In croup, in particular, when of a highly inflammatory character, blistering should not be attempted until the acute symptoms are subdued or have passed away; and then the blister should be applied rather to the nape of the neck or upper part of the sternum than directly to the throat itself. In bronchitis or pneumonia, blisters may be used at an earlier period, and more directly to the seat of the malady, with the best effect. But it is in affections of the head that we have the clearest evidence of the manner in which blisters should be employed, for every observant practitioner must have noticed the different effects of a blister in the different stages of these disorders—at once aggravating all the symptoms, if applied to the scalp in the first or acute stage; but mitigating them if only placed in the neighborhood, as the nape of the neck—while in the advanced or last stage of the disorder, when coma is present, and effusion has perhaps, taken place, covering the whole scalp with a blister is at times attended with the most marked improvement. Some attempt to obviate all evils, by applying blisters at some distant part (as one of the extremities) in the first instance; and such practice is common on the Continent, in the abdominal and cerebral inflammations of infants; but the plan is not very efficacious, while it is accompanied by all the risks attendant on excess in the local irritation. We therefore prefer waiting until the proper time, and then applying the blister near the affected organ; from which method, when judiciously employed, the happiest effects will often result. The application of a blister may often be made a substitute for bleeding in feeble children, or in cases of mere irritation or doubtful inflammatory character, as occurs in some forms of diarrhœa or cholera, convulsions or coma. In all cases, even of an inflammatory character, which appear clearly to have arisen from the suppression of an accustomed discharge, or long standing eruption, the use of blisters, in particular, is indicated. Thus obstinate convulsive attacks may, at times, be quickly removed by restoring the discharge from behind the ears, to which some children are so prone, by means of a blister, or simply by a thread smeared with blistering ointment; and even diarrhœa or cholera, occurring during dentition, may be prevented or much benefitted by a similar application, according to the statement of Dr. Parish, in cases where the eruption has not made its appearance, or has been repressed. The application of irritating ointments, liniments, or sinapisms, is in such cases particularly available, and may, in many instances, save the necessity for blistering.

The application of a blister is sometimes followed by the appearance of a troublesome pustular eruption, which not only surrounds the blistered surface, but occasionally spreads extensively over the body. It is the supervention of violent local irritation in the blistered surface itself, however, leading to sloughing, gangrene, and death, that makes so serious an objection to the use of blisters with children, and demands so much precaution, in order to lessen the liability to such disaster. To effect this, we guard against the too irritating action of the blistering plaster, by using it of only half the ordinary strength; or we protect the surface by the interposition of some thin substance, as fine muslin, or tissue paper. In no instance is the blister to be left on more than a few hours (from two to four)—not longer, in fact, than until the skin is reddened, when vesication will follow; but this result should not be waited for, as attendants always will do, unless the most express directions to the contrary be given. In very young children, indeed, an hour will suffice to ensure vesication, though no sign of irritation be present at the time of removal. When the blister is removed, care should be taken to preserve the cuticle unbroken, or to unload it (if over distended) by only a small puncture, and the surface should be dressed with simple cerate, fresh, and spread on lint, in preference to linen, which does not lie so smoothly on the part; or a soft poultice applied. When it is wished to continue counter-irritation, we prefer the employment of a succession of blisters to keeping open the part by means of irritating ointments, as being less distressing and hazardous to the child, although these are the very reasons for which others recommend the opposite practice. Should the blistered surface become irritable, looking very red, and showing a disposition to inflame, the dressing should be changed for the use of some fine powder, as flour, starch, or prepared chalk. This should be industriously applied, so as to keep the parts constantly dry, when frequently all symptoms of irritation will disappear. Should this not occur, however, but inflammation of the surface set in, with surrounding redness, a soft poultice will be the best application; or raw cotton, which is occasionally employed from the first, as with scalds, and from the use of which we have seen excellent results.

According to the character of the irritated surface, however, and the attendant constitutional symptoms, our treatment must be guided, as to whether we are to employ soothing or stimulating applications,—or attempt the total alteration of the action on the surface, as by nitrate of silver. When the constitutional symptoms run high, and the ulcer is very irritable, we use emollient applications; and of these, the following ointment, thickly spread upon lint, is that which we have found answer best. Its consistence prevents the necessity for frequent renewals, as it does not dry so quickly as the Carron oil, of which it may be looked on as a modification. We have seen it produce ease, in irritable ulcerations, when no other application could be borne:

No. 11.

Unguentum Sedativum.

℞

Aquæ Calcis
Olei Amygdal â. â, ℥ss
Bene admisce et adde
Adipis Preparatæ ℥i

M.

Ft. Unguentum.

When the ulcerated surface is pale with ash-colored spots and surrounded by a dull or livid redness, some stimulant application must be used, particularly if the accompanying fever assume the typhoid type; as in such cases it usually does. A favorite one with Mr. Colles is a lotion of camphorated spirits of wine and infusion of chamomile flowers (ʒi to the ℥i): his mode of employing this lotion is to place upon the part lint wetted with it, over which another piece of lint is then laid, the piece next the surface not being subsequently removed, but kept wet from time to time with the lotion, by means of a sponge. We have found advantage from the fermenting poultice, or lotions of chloride of soda, more particularly if gangrene have set in, accompanied by fetid odor. An excellent mode of treating the surface in such instances, when it begins to slough, is to alter the action going on, by brushing it over with a solution of nitrate of silver, (gr. x—℈i to the ℥i,) and then applying a soft warm poultice, as much pain often attends the application. In these cases, the full employment of tonics and stimulants is essential to support the constitution, so as to preserve life. The child will rapidly sink, unless supplied with nutritious diet—broth, jelly, or arrow-root, with a little wine; and the quinine or ammonia mixture should be freely given, according to the circumstances of the case. No matter how acute the original inflammation may have been, it usually all disappears when sloughing takes place. Such result is liable to occur, when blisters are applied, (no matter how cautiously,) to children much debilitated, or living in very unwholesome situations; and we should be slow to employ them, if any disposition to unhealthy ulceration has been manifested, as when spreading aphthæ, pemphigus, &c., are present.

In applying *sinapisms* to children, the powdered mustard seed should be mixed with an equal quantity of flour, or crumb of bread, and wetted with water only. The interposition of a piece of gauze or fine muslin will further protect the skin, if irritable; and the sinapism should not be left on longer than to redden the skin, when it causes much heat and pain, generally in ten or twenty minutes. These precautions are the more necessary, when the child, from insensibility, cannot complain, as troublesome ulceration, or even sphacelus, has followed the protracted application of sinapisms. Judiciously employed, they are a good substitute for blisters, in those slighter affections arising from irritation, and in particular, when connected with retrocession of an exanthematous eruption.

The other antiphlogistic remedies, like blood-letting, act principally as evacuants—yet not exclusively so, some special influence appertaining to most of them, while several act in more ways than one, being Emetic, Diaphoretic, or Expectorant, according to the circumstances under which they are administered.

We shall briefly consider each class in reference to infantile medicine, the variety of drugs employed in which is not great.

XI.—EMETICS

Are often given to the child, and are particularly serviceable in the first invasion of inflammatory and febrile complaints, which they occasionally cut short, and very generally mitigate. During the progress of remittent or other fever, an emetic may induce crisis, or give a favorable turn to the complaint; and in the exanthematous, in particular, when the eruption does not come kindly out, the greatest aid may often be derived from the administration of an emetic; and the supervention of bronchitis or pneumonia, as so often occurs in measles, is an additional occasion for the use of emetics in this class of complaints. It is in bronchial inflammations, indeed, that emetics are so necessary with the child, for clearing out the overloaded bronchial tubes, as well as emptying the stomach of what may have been accumulated there; children, as has been already remarked, being constantly in the habit of swallowing expectorated matter. At times they afford the only chance of relief, when suffocation threatens, in consequence of the quantity of mucus secreted, as we often see in catarrhal fevers. The power of an emetic in thus mechanically freeing the air passages, is remarkably exhibited in cases of croup, where portions of false membrane have been thus ejected. Emetics are not to be employed when the head is much engaged, or any gastric affection present. We should ascertain the type of a prevailing epidemic, so as to avoid the use of emetics at the commencement of the attack, when gastritis is liable to occur. In some epidemics we have seen the vomiting, caused by an emetic, persist until death took place. When the stomach is overloaded with indigestible matter, as after an over-full or unwholesome meal, an emetic is the immediate and certain remedy; often, at once, putting an end to the whole train of morbid symptoms, whether exhibited in the form of spasm and convulsion, or the more ordinary occurrences of pain, flatulency, and distension, attended by vomiting and constipation, or followed by diarrhœa. But it is only in the early stages of diarrhœa, and occasionally in colic, that emetics are admissible; as their injudicious use would only serve to complicate the case, by the addition of gastric irritation. In scrofulous or delicate children, with voracious appetite, but feeble powers of digestion, the tone and sensibility of the stomach may be often renewed, by the occasional use of a mild emetic, which not only frees the stomach from the accumulation of morbid secretions, but benefits the system at large by the stimulus thus given to exhalation and absorption, so aiding in the resolution of strumous deposits. The milder emetics, only, should be given to children, and of these, ipecacuanha is the chief. Tartar emetic may be administered, but is not to be chosen without good reason. Squill, though commonly given to infants in the form of syrup, is objectionable, its operation being violent, though certain. Sulphate of copper has been recommended; in particular, to expel the false membrane in croup; and continued in small doses, to prevent its formation. But no one acquainted with the disease would imitate the Germans in this practice; nor does the emetic action of the remedy seem to possess any peculiar advantages for the purpose proposed. Sulphate of zinc has, with better reason, been selected as an emetic, in the advanced stages of hooping-cough, when the strength is unequal to expel the viscid phlegm without the aid of an emetic; and the benefit derived from sulphate of zinc is often so remarkable, as to make it a popular remedy of some repute.

Ipecacuanha may be given as an emetic to the youngest infant, in doses of half a grain or a grain, blended with sugar, and repeated every quarter of an hour until it vomits; or ipecacuan wine may be similarly given, in doses of twenty drops, half a tea-spoonful, or a tea-spoonful. After a year old, these doses may be doubled and repeated at shorter intervals. On the Continent, a syrup of ipecacuan, (containing 16 grs. to the ℥i,) is used as we use ipecacuan wine; or an infusion made by digesting ʒij of the root in ℥iv of boiling water, which may be sweetened, and given in tea-spoonfuls. Ipecacuan is a very certain, as well as mild emetic, and will occasionally vomit a child when tartar emetic has failed. In addition to its effects as an evacuant, ipecacuanha has the power of counteracting inordinate action of the bowels, while it, at the same time, acts upon the skin, so as to restore the equilibrium of disturbed functions. In giving tepid drinks to assist its emetic action, we should wait until vomiting has begun, or is threatened, otherwise we may cause the ejection of the emetic before the stomach has fully expelled its contents. The following is a good general formula for its administration:

No. 12.

Mistura Emética.

℞

Aquæ ℥i
Vini Ipecac. ℥ss
Syrupi Simplicis ℥ss

M.

ʒi—ʒij sæpe ad emesem.

Tartarized Antimony is a powerful, though not always certain emetic. Its action is accompanied by much depression, and evacuation by the skin or bowels constantly follows its use. Hence, it is preferred in severe inflammatory affections of the chest, and its use is afterwards continued as a contra-stimulant. Tartar emetic may be given in minute doses—from one-sixteenth to one-eighth of a grain—to young infants; but when much depression is present, or the acute stage of the disorder passed, ipecacuan or squill is preferable. When gastric or intestinal irritation exist, tartar emetic is generally inadmissible; and, under all circumstances, it is advisable to have some fluid present in the stomach, before administering this medicine in doses sufficient to vomit, as poisonous effects have been observed to follow its use, when given on an empty stomach. Hence the judiciousness of Professor Hamilton's advice, that the child should be allowed previously to suck, or be given some drink.

No. 13.
Mistura Emetica Antimoniata.
℞
Aquæ Distillatæ ℥iss
Antimon. Tart. gr. i
Syrupi Simplicis ℥ss
M.

ʒi contains 1-16 of a grain; and from one to two or three teaspoonfuls can be given every quarter of an hour till vomiting occurs. ℥ss of ipecacuan wine, added to the foregoing, will make the action more certain, but less violent. The addition of squill, still farther adds to the efficacy of the compound, as follows:

No. 14.
Mistura Emetica Composita.
℞
Aquæ Distillatæ ℥i
Vini Ipecacuanhæ ℥ss
Liquor Antimon. Tart. ʒij
Syrupi Scillæ ʒij
M.

ʒi—ʒij sæpe ad emesem.

Squill, though so generally given to infants as an emetic, is too stimulating for common use, and should never be given at first, but in the advanced stages of pulmonary inflammation, or when other emetics have failed. The syrup or oxymel of squill, in half drachm doses, will be certain to evacuate the stomach, when repeated sufficiently often, particularly if combined as above. We have met a few children that resisted the action of all emetics, and had never been known to vomit.

XII.—EXPECTORANTS.

All the foregoing medicines act as expectorants, when given in small and repeated doses, or so combined as not to vomit.

Ipecacuan is that most commonly employed with children, and alone often suffices to remove slight catarrh, given in doses of a quarter or half a grain three or four times in the day. In severe attacks of bronchitis, ipecacuan alone cannot be relied on; but after the use of blood-letting, or tartar emetic, when the more acute symptoms have subsided, and much mucus is secreted, it is particularly indicated. It may be added to the tartar emetic, and given in mixture; or in powder, united with calomel. A minute quantity of opium in the form of laudanum, or Dover's powder, is usually added, to allay the irritability of the cough, and enable the stomach to bear the expectorant. If the proportion of opium be too great, its effect is injurious, by suppressing expectoration, and checking the cough, so as to add to the embarrassment of the breathing.

No. 15.

Mistura Expectorans.

℞

Aquæ Distillatæ ℥i
Mucil. Gum. ac. ℥ss
Vini Ipecacuanhæ ʒij
Syrupi Limonum ʒi
Syrupi Papav. somnif. ʒi
M.

ʒi horâ quâque secundâ.

This may be continued at longer intervals, or given between the doses of the following powder:

No. 16.

Pulvis Ipecacuanhæ et Calomelanos.

℞

Pulv. Ipecacuanhæ
Submur. Hydrargyri â. â. gr. x
Sacchari albi gr. xx
M.

gr. i—gr. ij horâ quâque tertiâ.

One grain of this compound contains ¼ of a grain, each, of ipecacuan and calomel, and constitutes the dose until twelve months old, when two grains are to be given: half a grain or a grain of Dover's powder may occasionally be added.

Calomel is thus frequently combined with ipecacuanha, and in severe cases its junction is essential for subduing the inflammatory action; but in ordinary cases, it is unnecessary or objectionable, as being liable to irritate the bowels, and when this occurs to any extent, the mercury must be suspended.

Nothing embarrasses the treatment, or adds more to the danger of inflammatory affections of the lungs, than complication with gastric or intestinal irritation. Tartar emetic cannot then be employed; and if mercury be given, it must be in very minute doses, and well guarded by opium. Our chief reliance in such cases must be on ipecacuanha, which will check the irritability in the bowels, if we can get it borne by the stomach. This we will be assisted in doing by combination with carbonate of potash or soda, and the addition of an opiate. The following formulæ will be found serviceable in such cases, and also during pertussis, or spasmodic cough:

No. 17.

Mistura Ipecacuanhæ Sedativa.

℞

Aquæ Puræ ℥iss
Vini Ipecacuanhæ ʒiss
Bi-carbonatis Sodæ gr. xij
Sirupi Simplicis ʒij
Tinct. Opii gtts iv
M.

ʒi—ʒij horâ quâque secundâ.

No. 18.

Pulvis Ipecacuanhæ Sedativus.

℞

Pulveris Ipecacuanhæ gr. ¼
Carbonatis Sodæ siccat. gr. i
Pulveris Doveri gr. ½ vel
Pulv. Cretæ Comp. c. Opio gr. ij
M.

Sumat pulverem talem horâ quâque tertiâ vel secundâ.

Tartar Emetic is a more active agent in the treatment of acute inflammations, and in such cases is, therefore, to be preferred, particularly in pneumonia. Our object is to get a sufficient quantity of the medicine borne; and the *tolerance* of tartar emetic can be attained with the child, as well as with the adult, though not perhaps, so quickly. When depression attends its use, this should be obviated by the addition of camphor mixture, or a few drops of spirit of lavender, or tincture of cinnamon; but if debility be combined with inflammation, (especially when a blue tinge of surface is present,) the best adjunct is ammonia—a few drops of its aromatic spirit being added to each dose; ammonia being altogether the best antidote to the depressing effects of antimony, which we must bear in mind is capable of reducing the infant nearly as much as blood-letting.

No. 19.

Mistura Expectorans Antimoniata.

℞

Aquæ Menthæ ℥i
Mucil. Gum. Ac. ℥ss
Liquor. Antimon. Tart. ʒi—ʒij
Sirupi Limonum ʒij
Tinct. Opii gtts ij
M.

ʒi—ʒij horâ quâque secundâ.

In severe cases, blood-letting should precede the use of the tartar emetic; in the milder forms, the latter alone will suffice; and in feeble children, from whom we may fear to abstract blood, tartarized antimony will serve as a substitute; or still better, the combination of this medicine, or James's powder, with calomel: by which means also, repetitions of blood-letting may, in many cases, be saved.

Squill is employed as an expectorant in chronic bronchitis, &c. &c., particularly when the phlegm is viscid and difficult to get up, the febrile heat having subsided. Squill is seldom employed alone; when it is, twenty drops of the syrup, or ten of the vinegar of squill, may be given every third hour. It may be added to either of the expectorating mixtures already given, in the proportion of ʒi of the syrup, or ʒss of the vinegar or tincture, to each ounce of the mixture; or from $\frac{1}{8}$ to $\frac{1}{4}$ of a grain of the powder of squill added to each dose of the powder of calomel and ipecacuan. By combining squill in this manner, we can sooner have recourse to its use, and longer continue that of the other expectorants. Combination with an alkali lessens the acrid qualities of squill, without depriving it of its expectorant power. The following mixture will be found very serviceable in pertussis, or spasmodic cough, with chronic bronchitis and secretion of viscid phlegm:

No. 20.

Mistura Scillæ Sedativa.

℞

Aquæ Fœniculi ℥iss
Tincturæ Scillæ ʒiss
Carbonatis Sodæ gr. xij
Sirupi Tolutani ʒij
——— Croci ʒij
Tinct. Opii camphor. ʒss
M.

ʒi—ʒij horâ quâque tertiâ.

Polygala Senega.—This is a very stimulating expectorant, and used only in advanced stages of pulmonary inflammation, or after inflammatory action has been subdued. In such cases, when a dry, hoarse cough remains, attended by some difficulty of breathing, polygala will be found very serviceable; and Eberle prefers it to every other expectorant in the sequelæ of chronic catarrhal affections, particularly if of a croupy character. It is very liable to cause purging and vomiting; but the latter result is at times desirable, when the air tubes are much loaded, and the strength inadequate to coughing up their contents. Ammonia is often added to the polygala in such cases, —the acetate, citrate, or carbonate being prescribed, as follows:

No. 21.

Misturæ Polygalæ.

℞
Decocti Polygalæ Seneg. ℥i
Aquæ Ammoniæ Acet. ℥ss
Syrupi Scillæ ʒij
Syrupi Papav. alb. ʒij
M.

ʒi—ʒij horâ quâque secundâ.

No. 22.

℞
Decocti Polygalæ ℥iss
Carbonatis Ammoniæ gr. iv
Tinct. Cinnam. c.
Syrupi Tolutani ā ā ʒij
Syrupi Papav. alb. ʒij
M.

ʒi—ʒij horâ quâque tertiâ.

It is at that critical and dangerous period of catarrhal fevers (often so difficult to detect) when inflammation passes into debility, that the peculiar stimulant action of polygala, when exhibited in such combinations, is particularly manifested. In feeble children, the quantity of ammonia may be increased to double the amount above prescribed, and freely exhibited, until the obstructing phlegm be removed; when the happiest results may be witnessed, children being thus restored to safety, when apparently at the point of suffocation. In less urgent cases the muriate of ammonia may be used instead of the carbonate in the foregoing formula, in the proportion of five or six grains to the ounce. This salt of ammonia is a favorite remedy in Germany, though so seldom employed internally by British practitioners: we have ourselves witnessed its good effects in several instances.

Polygala, in union with the other expectorants, makes a very powerful and celebrated compound. In free doses, it vomits strongly, and, as an expectorant, exercises a decided control over the more advanced stages of inflammation in bronchitis, croup, pertussis, &c., when other means have failed. Coxe's hive syrup, so famous in America, in such cases, is a compound of this kind; but we prefer the following formula (which resembles the anti-croup mixture of the Parisian hospitals) as being more easily prepared:

No. 23.

Misturæ Polygalæ Comp.

℞

Decocti Polygalæ Seneg. ʒiijss
Oxymel. Scillæ ʒij
Vini Ipecacuanhæ ʒij
Antimonii tartarizati gr. i
M.

Ten minims to a scruple, to be given every quarter of an hour, to vomit; or every hour or two, as an expectorant. A small teaspoonful may be given to a child two years old.

No. 24.

Dr. Coxe's Hive Syrup.

Mel Scyllæ Compositum of the Pharmacopœia of the United States.

℞

Scillæ
Polygalæ Senegæ â â ℥i
Aquæ ℔ i
Melli despum. ℔ ss

Ft. Syrupus—cuique unciæ cujus addatur Antimonii tartarizati granum.

This acts by vomiting, purging, and sweat, the dose being from ten drops to one or two tea-spoonfuls.

When much oppression is present without expectoration, the addition of five or ten drops of the tincture of the lobelia inflata to one of the foregoing mixtures, often gives prompt relief, and may be given safely to young infants, provided sickness be not induced.

In cases, on the contrary, where an over-abundant excretion from the lining membrane of the lungs harasses or oppresses the child, being a sequel or accompaniment of inflammatory action, (as we see in some forms of bronchitis, or during the progress of hooping cough,) we may, with all safety, have recourse directly to astringents; and great benefit will arise from checking this inordinate secretion by the administration of acetate of lead, or alum; an emetic being occasionally first prescribed, and the bowels always unloaded—though neither of these medicines have we found to constipate the bowels, given even in free doses to young children. From ½ a grain to a grain of acetate of lead may be given every second or third hour, combined with powdered squill, ipecacuanha, or Dover's powder, according to circumstances. The dose of alum given in mixture, will be from one to three grains, every third or fourth hour.

XIII.—DIAPHORETICS

Are not much employed in the treatment of children's disorders, nor do they seem to merit more extended use. Perspiration is not easily induced; and the partial sweats which we witness over the head or abdomen, in affections of these regions, are not attended with benefit—rather the reverse. The intensely hot skin often attendant on the febrile diseases of childhood, will be best met by refrigerants, diuretics, or baths. Nitre exhibits its power in lessening febrile action remarkably in the child, and will be given with advantage in all such cases. Its combination with ipecacuanha is especially serviceable (from quarter to half a grain of the latter, with from two to six grains of the former, every third hour); and is better calculated to act on the skin than either alone; often lessening the febrile heat remarkably: in very acute cases, antimonial, or better, James's powder, may be substituted for the ipecacuanha. Nitre may be freely given, in whey or barley water, to the extent of ten grains or a scruple daily, even to young children. Should the bowels become irritable, the nitre must be discontinued, or guarded by combination with a little opium. When much heat of skin attends, this will be found very serviceable, even though diarrhœa be present. Sweet spirits of nitre, in doses of five to ten drops, three or four times a day, is a popular and efficacious medicine during the febrile attacks of children; but it is oftener to the action on the kidneys rather than on the skin, that good results are to be attributed.

XIV.—REFRIGERANTS.

The vegetable acids are not often given to children as refrigerants, in consequence of the tendency to acidity and irritation of the bowels, so frequently present in infantile disease; but drinks slightly acidulated with lemon juice or tartaric acid are often very serviceable. The latter is best given in the form of bi-tartrate of potash, as weak imperial, and has the advantage of increasing the flow of urine, while it tends to keep the bowels open; if they are irritable, of course, these acids are not admissible. To boracic acid in particular is attributed some sedative influence, which causes it to be much employed on the Continent in the cerebral affections of infants. A drachm dissolved in six ounces of water, sweetened, forms the 'Potion Calmante' of the Hôpital de la Maternité: it is given in the dose of a tea-spoonful frequently, and may be used in preference to other acids; but is not to be relied on, as it seems to be, in the treatment of cerebral affections at that hospital.

The mineral acids combine a well known tonic and refrigerant power; but are not as often had recourse to in the convalescence of children as they deserve to be.

The best of refrigerants, however, is cold water, and it should be largely given to all children laboring under febrile disease, and desiring cold drinks, as they usually do; even infants at the breast are much benefited by the occasional administration of a little cold water under such circumstances. If the stomach be very irritable, the water may be iced; and in no case should children desiring cold drinks be denied them, as is too commonly done. Occasionally warm drinks are preferred: this happens usually in some form of bowel complaint, and has been assigned as a symptom of inflammation of the ileum in particular.

The influence produced upon the skin sympathetically from the use of cold drinks predisposes it to perspire, by lessening the action of the surface, and so diminishes the heat. This is an important part of the good thus done; but may be directly attempted by the use of tepid or cold sponging, or the employment of baths.

Sponging the surface, as we do in the febrile diseases of adults, is not practised at all so frequently with children as it deserves to be. Caution is requisite in the use of these means, particularly in the eruptive fevers, where the employment of cold sponging, or even dashing, is occasionally serviceable; but much judgment is required before having recourse to this measure, which should never be employed unless the febrile symptoms run high, and power of reaction be undoubtedly present. The local application of cold is one of our most frequent and powerful means of subduing increased action. Its mode of employment is important: to be effectual we must use it steadily, but should be careful to avoid giving the child a chill, as severe bronchitis not unfrequently follows the application of wet cloths to the head in young children. Ice enclosed in a bladder, or a refrigerating mixture put therein, is the safest and best mode in severe cases, as acute affections of the head or spine, when the cold should be kept constantly applied—an important means not only of subduing increased action, but preventing serous or lymphatic effusion within the head or spine, and by which alone severe cases of congestion may often be subdued. When the temperature has been completely reduced, we should intermit the application of the cold, as dangerous revulsion, induration of the integument, or even sloughing, might be induced; but before the recurrence of reaction, we must again renew the application of cold; or the violence of the reaction thus induced might do more harm than the good we had effected in the first instance.

Pouring a stream of cold water on the head, (held over a basin, so that the water shall flow backwards over the head, not down the face,) has been in particular recommended in severe cases of convulsions. The employment, at the same time, of the partial hot bath, as a derivative, the feet or hands being immersed therein, adds much to the effect of this remedy. Cold applied in either of these ways, may require frequent repetition and long continuance; for although not at any one time to be unceasingly employed, it may be necessary to renew its application every hour or two, night and day, for several days in succession, until the morbid symptoms be entirely subdued. The local application of cold is almost exclusively confined to the head, and hot fomentations alone are applied to the abdomen; but the order may be reversed with advantage under certain circumstances. When the cerebral symptoms are those of depression, and have arisen in a child much debilitated, run down by very active depletion or severe vomiting and purging, the application of hot fomentations to the head, or lotions of warm vinegar and water, will be often found of signal service; whereas cold, which is so universally used, even under such circumstances, only adds to the severity of the symptoms. On the contrary, in cases of acute abdominal, or even thoracic inflammations, with great heat of skin over these regions, cold lotions have been recommended, and are said to have produced the best results; but popular prejudice is strong against such practice as yet,*—and though we have occasionally employed them with comfort, if not benefit to the patient, in cases of gastritis, we have not had opportunity for making extensive observations on the subject.

The most useful and best known of all refrigerants, however, is fresh cool air; and to such the child should ever be exposed when laboring under inflammation or fever; not placed in a heated and over-crowded apartment, as is too often the case with the sick infant. The temperature of the chamber should not exceed 65° F., and if febrile symptoms run high, with much heat of skin, a stream of fresh air may be allowed to enter directly into the apartment, from which the best effects result in the acute stage of exanthematous fevers, especially small pox and scarlatina. If these disorders are subsiding, however, and in particular at the period of desquamation, when the sensibility of the skin is morbidly exalted, care must be taken to maintain an uniform and warmer temperature, particularly in measles, and indeed always when pulmonary inflammation is present.

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* The reign of Hydropathy had not then been established. [Note to 5th Edition.]

XV.—BATHS.

The general warm bath is constantly employed with the infant to soothe irritation, allay pain, induce rest, and subdue febrile action. To effect the latter object, however, its use must be cautiously had recourse to; no remedy, perhaps, is more abused than the hot bath with infants. A bath for a child should never be very hot, but warm, the temperature not exceeding 98° : 95° is a good average temperature; but when the object is to reduce morbid heat and retard the pulse, so as to relieve pain and allay spasm or nervous excitement, 92° is the temperature that we have found most serviceable, and which nearly accords with the experiments of Marcus, who recommends 90° as most efficacious. In acute inflammatory affections, the general hot bath is altogether objectionable, causing hurried breathing, and exciting the circulation so as to aggravate the disease, particularly if seated in the respiratory organs. When the abdomen is the seat of the affection, it is less objectionable; but, in all acute cases, the bath should be local; and it may then be of higher temperature. When not too hot, we can leave the child for a longer period in the water —from ten to fifteen minutes: and its most beneficial effects may thus be ensured. Great care should be taken to dry the child perfectly, and keep it warm after being taken out. The use of the local hot bath, as the pediluvium, is one of our safest and best means for inducing derivation, or acting on the principle of counter-irritation, and is frequently adopted, especially in affections of the head.

The forms of disease for which warm bathing is required are chronic inflammatory affections, particularly of the skin and abdomen; and in some forms or stages of fever. In the eruptive fevers, especially when the brain or nervous system is much disturbed, and the eruption is slow to come out or has receded, a warm bath is most beneficial; and in the same complaints during convalescence, when the skin is harsh and dry, tepid bathing contributes much to the comfort as well as benefit of the child. So in cutaneous disease. In abdominal affections of a chronic character, as peritonitis, enteritis, protracted diarrhœa, &c. &c., we have seen the best effects from leaving children for hours together in a tepid bath, the temperature of which, as well as the time for remaining in, being regulated by the feelings of the patient. This practice is an imitation of the method so successfully pursued with some mineral baths on the continent; and from which we have witnessed the happiest results. Warm bathing is similarly recommended in chronic pulmonary affections, particularly pneumonia; and its benefits are highly spoken of by some German writers, as Seifert, Horn, &c.—The bath is to be used frequently in the day (at least twice); the temperature of the water varying from 95° to 98°, that of the apartment not being below 65°; and the child is to be left in the bath as long as possible. The practice is doubtless worthy of imitation; but we have ourselves seen so much mischief done by the abuse of hot baths in pulmonary inflammations, that we confess to feeling some prejudice on the subject. While employing warm bathing, we must keep in mind that its protracted or frequent use much predisposes children to take cold. Hence all due precautions must be had recourse to; and we should watch the earliest opportunity for discontinuing the practice, or exchanging the use of the warm for that of the tepid or cool bath.

In the use of the cold bath we have a tonic of peculiar efficacy if judiciously employed with children of delicate frame and strumous constitution, characterised by general debility and languid absorption, provided there be not much irritability present. Bathing in the open sea constitutes the best form of *plunge* bath, and we should have said pleasantest, had we not often witnessed the mode in which it is commonly administered—the affrighted child being plunged under water in such sudden and quick successions as almost to deprive it of breath: this practice should certainly be amended. The use of cold bathing with the child is to be directed on the same principles as for the adult. We must be careful to ascertain that there is adequate power of re-action present, so as to ensure the tonic result of this remedy, and not persevere unless the child become ruddy and animated on coming ont of the water; and improve in strength and appetite. With delicate children it will often be well to prepare them by the use of the tepid or cool bath, for the greater shock to be endured by a plunge in cold water or the open sea. The best time for sea-bathing is about noon, and the best seasons, summer or the early part of autumn.

The *shower-bath* possesses particular advantages as a tonic, in nervous debilitated children, subject to spasmodic or convulsive affections, particularly where the head has been engaged; one of the advantages of the shower-bath being, that the shock comes principally and primarily on the head (which should always be the part first wetted in cold bathing) and upper parts of the body, so that there occurs no oppression of the breathing, nor tendency to rush of blood, as at times take place in ordinary bathing. The water thus employed, should be at first tepid or at least cool, before we try the full effects of cold water; and a very convenient form of shower-bath for a child, is the perforated tin vessel now in such general use.*

Medicated baths are employed when we wish to produce an effect on the cutaneous surface or the constitution, beyond what mere temperature or the mechanical action of water can impart. As such effects are particularly manifested in the child, while it is often inconvenient to bring children to a mineral spring, or even to the sea-side, it is useful to know how we may make a substitute for these more efficient means. With regard to thermal waters, however, it is as well at once to confess, that no equivalent can be supplied by artificial means, their peculiar efficacy arising, not from the saline constituents they may contain, (and which are often more insignificant than those of common water,) but chiefly, if not solely, from the peculiarities of the caloric with which they are combined.

The artificial *salt-water* bath, is made by adding from a quarter of a pound to two pounds of common salt to the bath, according as the age of the child varies from one to seven years. The child should remain from fifteen to twenty minutes in the bath, to insure its full effects, but if used warm, the temperature should hardly exceed 92°, or the bath may prove too stimulant for the skin. The increased stimulus thus afforded, adds much to the efficacy of the bath in glandular tumors; and various forms of scrofulous cachexy, especially if the cutaneous circulation be languid.

Alkaline baths are used in nearly similar cases, when we wish to make a more powerful impression on the nervous system, and in particular, to promote secretion and absorption. Hence their utility in cases of spasm and convulsion, chronic cutaneous disorders of a strumous character, mucous discharge, mesenteric disease, &c. For infants, soap is a sufficiently active alkaline ingredient, but for more grown children, or in severe cases, the carbonates of potash or soda can be employed: of soap, from quarter to half a pound, will medicate a bath for a child from two to five years old; the quantity of soda or potash varies from three drachms to six for each gallon of water.

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* This vessel is thus described by Dr. M. Hall, in his notes on Underwood. "It consists of a tin vessel, in the form of a large bottle, pierced at the bottom like a cullender, and terminating at the top part in a narrow tube; when put into water it becomes filled with this fluid, which is retained, by placing the fingers upon the tube; on removing the fingers the water flows out gradually."

Sulphureous baths are employed in all the foregoing cases when of an obstinate character, or after alkaline baths have been tried. In particular, they are more efficacious in some forms of cutaneous disease, as psoriasis and lepra; and are highly recommended in some nervous affections, as chorea. Sulphuret of potash is the most convenient adjunct for baths, in the proportion of half a drachm to a gallon of water; but bruised sulphur infused in boiling water for twelve hours, (in the proportion of half an ounce, or an ounce, to a quart of water,) makes a less disagreeable and sufficiently efficacious bath, or lotion for infants and young children, as advised by the late Dr. Clarke. *Iodine* is the most active agent with which to medicate water for baths, and that from which we receive most advantage in the treatment of scrofulous affections in general, and in particular, in some rebellious forms of cutaneous disease. From half a drachm to two drachms of hydriodate of potash may be dissolved in each gallon of water; or ioduretted baths prepared according to the formula of Lugol, as given in the chapter on Scrofula. *Steel and bark* may both be employed for the purpose of medicating baths; and the effect of such solutions, externally applied, is decidedly strengthening: they may be so used as a substitute for the internal use of tonics, when these are objectionable. For children, however, we do not find it necessary to employ the actual bath, as sponging the surface with solutions of iron or bark is quite sufficient: and tone may be thus speedily given to the relaxed frame. Ten grains of sulphate of iron, or twenty drops of the muriated tincture may be added to each pint of water, or the cold infusion of cinchona bark employed.

This medication of baths adds much to the efficacy of internal remedies, of similar indication, employed at the same time; or renders equally efficacious the administration of a lesser quantity of the medicine. When using stimulating substances, we must take care that the child's eyes are not irritated thereby; and when employing sulphureous impregnations, we should protect the child from the annoyance of sulphuretted vapor. The quantity of water for a bath, according to the age of the child, may be conveniently estimated at about sixteen gallons for an infant, double that quantity at three years old, and forty gallons at seven.

XVI.—PURGATIVES.

Children often require the administration of purgatives. By some, indeed, they are the only form of medicine given to the child; and much injury is done by their protracted use, or frequent repetition. Were children properly managed, however, especially as to matters of diet, the necessity for this class of medicines would be diminished, and an overloaded or deranged state of bowels be less common. A judicious variation of food would, in many instances, save the necessity for physic; and in others, the simple warm water enema, or even the mere insertion of a small roll of twisted paper, dipped in olive oil, (as nurses in their sagacity are wont to adopt,) would be found sufficient to obviate the occasional costiveness of an infant.

When the bowels become overloaded in the child, however, or their secretions deranged, much disturbance of health usually attends, and often severe suffering. Acidity and flatulency seldom fail to occur—griping and purging follow, or the bowels become constipated, and the stomach unsettled—febrile symptoms attend, usually of the remittent type—sleep is disturbed, and the head is liable to become engaged—convulsions not unfrequently arising. The judicious employment of purgatives will often remove all these symptoms; and hence their frequent utility. But similar symptoms may be caused, and often are, by the abuse of purgatives, so commonly witnessed in the treatment of children's disorders,—the stomach and bowels being thus irritated to an injurious degree.

Our first object in the administration of purgatives generally is, to empty out the intestinal canal: and in the young infant we try to effect this by the mildest means. Half a drachm to a drachm of fresh, cold-drawn castor-oil, blended with a little soft sugar, or made into an emulsion by the aid of mucilage of gum and an aromatic water, is the common dose and mode of administration. Syrup of violets, though seldom given in this country, is, when genuine,* an effectual, as well as agreeable, laxative for infants, in doses of one or two tea-spoonfuls; or it may be combined with castor-oil, instead of sugar. Syrup of roses, and syrup of senna, are likewise laxative syrups sufficient for children.

Castor-oil has the advantage of acting with expedition, and certainty, fully freeing out the bowels; and is, hence, the laxative selected when we want to carry off any substances which may be lying in the intestines, whether old lodgements of their contents, foreign bodies which may have been swallowed (and often are by children) or even other purgatives (as calomel, scammony, &c.) which may have failed to act with sufficient expedition, or the action of which we wish to hasten and ensure. Hence, also, is castor-oil so commonly given at the commencement of diarrhœa, when caused by improper food or an over-charged state of the bowels; and even in its advanced stages, should scybala appear; but we must bear in mind that this medicine proves highly irritating to the mucous membrane when in a state of excitement or inflammation, (as in dysentery,) and is therefore not to be indiscriminately given in the bowel complaints of children. The dose of castor-oil may be estimated at one drachm for each year of the child's age: but it has no effect in altering the secretions, and as the child grows older, other laxatives are required.

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* Which may be known by its being changed to red by acids, and to green by alkalies.

Manna is the aperient now generally selected, being sweet to the taste, and ranking next to castor-oil in mildness of action, so that it may be administered to the youngest infant. The best flake manna should alone be used; and may be given in doses of half a drachm to one drachm or two, in some aromatic water, so as to lessen its liability to cause flatulency or griping; or combined with some other laxative to ensure its aperient effect. A slight demulcent and even diuretic action is attributed to manna, sufficiently manifest in the child, at least, to render its selection advantageous as an addition to aperient mixtures, given in catarrhal and febrile attacks.

In the following formulæ, manna is prescribed alone, and in combination with other purgatives: *

No. 25.

Mistura Mannæ.

℞ Mannæ optimæ ℥ss
Emulsionis Arabicæ ℥ss
Syrupi Violæ ʒij
Bene commisce, cola et adde
Aquæ Menthæ ℥i M.
ʒi—ʒij horâ quâque tertiâ ad effectum.

No. 26.

Mist. Mannæ. Comp.

℞ Infusi Sennæ ℥i
Aquæ Menthæ ℥ss
Mannæ ʒij
Bene commisce, cola et adde
Magnesiæ ℈i
Tinct. Rhei ʒi
Syrupi Rosæ ʒij M.
ʒi—ʒij horâ quâque tertiâ ad effectum catharticum.

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* The following is copied from Edwards' and Vavasseur's Nouveau Formulaire Pratique:

Pastilles de Manne tartarisée.

℞ Crême de Tartre ℥ ss
Manne ℥ iv
Eau ℥ x M.

Faites cuire jusqu' à consistance convenable, et faites des pastilles de 10 à 12 gr. Laxatif d'un usage commode pour les enfans.

Magnesia is often given to children, being a very mild aperient, and from its antacid and sedative properties peculiarly adapted for them. When acid is present, it acts expeditiously upon the bowels, thus forming an active aperient salt; and its sedative influence is remarkable in cases of nervous excitement depending on intestinal irritation. From the prevalence of acidity and the quick action of the bowels in children, we need not fear the formation of *concretions*, as sometimes occurs with adults; and Hufeland even attributes the sedative action of magnesia, in a great measure, to the effect of its presence on the mucous membrane, acting as a protective layer to sheath the sentient extremities of the nerves. Mixing magnesia with the food of children suffering from acidity, and liable to constipation, is an easy mode of giving medicine; and Dr. M. Hall's suggestion is good, to add the magnesia to the last meal at night, to be worked off in the morning by an enema, if necessary. It is generally given in combination with other purgatives; and blended with syrup of roses, or combined with manna, (as in the foregoing formula,) magnesia constitutes an efficient aperient for common use. The dose varies from a few grains to half a scruple, for infants and children of two or three years old, after which a scruple to half a drachm will be required twice or thrice a day.

The neutral salts furnish us with a class of aperients particularly serviceable in the febrile and inflammatory affections of children. Of mild and easy operation, they not only serve powerfully to deplete the system, but do so in a manner similar to that commonly adopted by Nature herself in freeing children from disease—namely, by causing copious secretion from the intestinal glands and mucous membrane. In this respect their action is so remarkable as to answer, in many instances, instead of the more specific action of mercury, the use of which may thus be frequently spared, even where the liver is implicated. The saline aperients best adapted to children are tartrate of potash and sulphate of magnesia. Tartarized soda, as a more energetic salt, is, in severer cases, necessary, and sulphate of potash has some properties which have long made it a favorite medicine in the treatment of children's complaints. Sulphate of soda we seldom or never prescribe for a child. It is the most liable to irritate the mucous membrane, causing exhausting watery stools, without carrying away solid contents: but we must always keep in mind while using saline purges, that numerous liquid stools may follow without the bowels being once emptied out.

Whichever of these salts we employ, it should be freely diluted, both to protect the mucous membrane from irritation and to promote the purgative action. The latter object will be best and most conveniently attained by giving the child some bland diluting liquid a short time after the salt has been swallowed, while we select thin barley water or weak chicken broth as the best vehicles in which to administer the medicine; and salts are always less liable to disagree when the fluid in which they are taken is swallowed warm.

Phosphate of Soda may, from its purely saline taste, be thus administered in broth or gruel, without the child being conscious of taking medicine; the quantity sufficient to move the bowels being little more than what is required to impart an agreeable saline taste. We have found this a most convenient aperient in cases of delicate fretful children. But *tartrate of potash* (soluble tartar) is at once the mildest and most efficient saline aperient that can be employed in febrile and inflammatory affections of children. It is that which we most frequently prescribe, being quick in operation and acting extensively over the intestinal canal; while it not only does not gripe, itself, but lessens this tendency in other purgatives, as scammony and senna, when combined with them. The dose of these aperient salts varies from one scruple to half a drachm, given every two or three hours, until it operates. The *tartrate of potash and soda* (Rochelle salt) is a more energetic aperient, possessed of little disagreeable taste; but fit only for older children. It is the salt most usually added to the infusion of senna; and is the best suited to join with tartar emetic, when we require to exhibit a powerful, depressing evacuant, in acute inflammatory and febrile cases. *Sulphate of magnesia* we have found particularly serviceable when the stomach was irritable, or colicky pains present. We have been enabled to open the bowels easily by a solution of the *pure* sulphate of magnesia in mint tea, (infusion of fresh mint,) when all other medicine was rejected. The addition of lemon peel hides the nauseous taste of Epsom salts, as also union with the bitartrate of potash. Hence the common refrigerant drink called *imperial* (and made by dissolving one drachm of cream of tartar in a pint of boiling water, sweetened and flavored with lemon peel) constitutes an elegant vehicle for exhibiting sulphate of magnesia to children—a combination which appears to have in addition, the advantage of restoring tone to the stomach, while it removes constipation, as has been justly noticed by Dunglison. The addition of a bitter, prevents the tendency which a long or frequent use of saline purges has to debilitate the digestive organs; but no compound for this purpose is so efficacious as that of dilute sulphuric acid with sulphate of magnesia, and aided by the addition of a little tincture of orange-peel, exhibited in the well known mixture, infusion of roses; from which we have derived the most signal advantage in the treatment of those cases of constipation with relaxed mucous membrane, so common in children, and so often accompanied by prolapsus ani. A solution of this salt in camphor mixture, with the addition of some sulphate of iron, has the advantage of regulating the action of the bowels; the presence of steel in saline aperients tending more than anything else to insure an equable action of the intestinal canal.*

Sulphate of potash is more persistent in its action, and its continued use more directly influences the glandular secretions into the intestines. Hence, though seldom given alone, it is much used in combination with rhubarb; and this compound (or rather the compound of rhubarb with *sal polychrest*) constituted the favorite remedy of the older English practitioners, particularly Fordyce, in the treatment of disordered bowels in children, especially when connected with mesenteric disease. When more active purgatives are required, or one exercising a wider range of action, by exciting the muscular fibres, and causing fœcal evacuations rather than watery discharges; *rhubarb* is that generally chosen, being at once certain and safe, so that it may be given to the youngest children. Rhubarb has a tonic and astringent action as well as aperient, which strengthens the stomach, while the bowels are kept free; so that not only are the digestive organs improved by its use, but a general alterative action apparently exercised upon the constitution. Hence has rhubarb long held its repute as a valuable aperient in most of the complaints of childhood. From three to five grains taken every morning, or one or two drachms of the infusion, continued for some time, with occasional intermissions, tend to restore tone to the stomach and bowels, so often in a relaxed and irritable condition in children of a strumous habit, or inclined to mesenteric disease; but rhubarb is seldom given alone. Its combinations constitute our best and most manageable purgatives in infantile practice.

Rhubarb àcts most powerfully when given in powder; but the infusion (Ed. Pharm.) is sufficiently active for the child, and perhaps more convenient, as the taste can be thus better disguised. Cinnamon has this tendency, and should therefore be selected as the aromatic with rhubarb. Any of the neutral purgative salts may be combined with infusion of rhubarb. Rochelle salt, or soluble tartar, are preferred; and magnesia (which corrects the tendency that rhubarb has to gripe) is a favorite combination for children, either in this form or in powder:

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* In the Pulna waters we have a natural combination of this salt with other aperient sulphates; and it is altogether the best medicine we know of to overcome habitual constipation. From one ounce to two, taken in hot water, or (for feeble children) in double the quantity of Marienbad water, will soon remove and correct constipation. [Note to 5th Edition.]

No. 27.

Pulv. Rhei & Magnesiæ.

℞ Pulv. Rhei ℈i
Magnesiæ calcinatæ ℈ij
Pulv. Cinnamomi gr. x M.

This may be given in doses of three or four grains, every third hour, to a child of six months—six or ten grains will be required after twelve months old; and occasionally even much larger doses.

An elegant substitute for the above formula, and which may be considered as equivalent to Gregory's powder, in a liquid form, can be made by triturating finely powdered rhubarb, for a few minutes with "fluid magnesia," straining the liquor, and adding a little syrup of ginger.* A drachm of coarsely powdered rhubarb macerated in three ounces of Brandishe's alkaline solution, also furnishes an excellent preparation, at once more tonic and aperient than the simple infusion. These combinations of rhubarb with an alkali, particularly when improved by the addition of a bitter, as columba, constitute a valuable association of medicines of extensive utility in that large class of disorders incident to childhood, in which faulty digestion and slow bowels are joined with general delicacy of constitution.

Sulphate of potash forms the most common combination with rhubarb, and so joined they act even more directly than the neutral salts alone, upon the liver and other intestinal glands, so as to afford an efficient substitute for mercury, in altering their secretions.

We subjoin a formula for the exhibition of rhubarb with bi-sulphate of potash, which from its acidity tends to disguise the taste; but being deliquescent cannot be given with rhubarb in the form of powder.

No. 28.

Infusum Rhei Salinum.

℞ Infusi Rhei ℥iss
Bi-sulphatis Potassæ ʒss
Tinct. Cinnam. ʒss
Syrupi Sennæ ʒiv. M.

ʒi—ʒij horâ quâque tertiâ.

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* See remarks on some uses of Sir James Murray's "Fluid Magnesia," published by Mr. Donovan, in the fourth vol. of the *Medical Press.*

The profession are much indebted to Sir James Murray for the introduction of so important an acquisition to the Materia Medica, as the Fluid Magnesia—a preparation particularly available in the treatment of children's complaints. [Note to 4th Edition.]

Rhubarb is the medicine generally selected as a purgative at the commencement of diarrhœa, or during its progress; whenever, in fact, we wish to leave the bowels with a tendency to remain quiet, after having been acted upon. Hydrargyrum cum cretâ is generally combined with it under these circumstances, especially if the biliary secretion be much deranged. The addition of half a grain, or a grain of Dover's powder, or double the quantity of pulv. cretæ comp. cum opio, renders the operation of the aperient milder; and, indeed, may be often added with advantage to any purgative for the child, when we apprehend griping, or that the bowels are irritable. The astringent property of rhubarb is increased by toasting the root before pulverising it.

No. 29.

Pulvis Rhei Compositus.

℞

Pulveris Rhei ℈i
Hydrargyri c. cretâ gr. x
Pulveris Aromatici gr. v
M.

gr. iij—gr. v horâ quâque tertiâ.

Calomel may be used instead of hydrargyrum cum cretâ, but half the quantity will suffice; and if an opiate be then added, it should be Dover's powder, not powder of chalk and opium.

Senna is a prompt cathartic, but liable to gripe; it produces a decided, though not violent impression on the system, and may be used instead of rhubarb, or in conjunction with it. Senna does not exercise the same salutary influence on the digestive organs, however, but is more efficient in febrile and inflammatory complaints, particularly when the bowels are loaded with mucus. It is usually given in combination with some of the neutral salts, as well to correct its tendency to gripe, as to exalt its efficacy as an aperient.

Infusion of senna, when prescribed for children, should not be ordered of more than half the ordinary strength; or it should be diluted by an equal quantity of some aromatic water, of which pimento is to be preferred as best hiding the taste. Tincture of orange peel and other bitters, have a similar effect, and may, in general, be added. Baudelocque suggests a convenient way of depriving senna of all medicinal appearance, and giving it as drink, by preparing coffee with an infusion of senna, made by pouring the required quantity of cold water on one drachm of senna leaves over night. To this we are in the habit of adding as much liquorice as will impart sufficient sweetness. The powder of senna is inconvenient from its bulk, but the compound powder, containing scammony, may be occasionally prescribed with advantage, in doses of gr. iij. to gr. vi. every third hour, when the bowels are difficult to move. Syrup of senna is a good laxative, and convenient adjunct in half drachm or drachm doses; but the manna is liable to separate on its being kept, which could be avoided by ordering treacle, instead of sugar in making it up.

No. 30.

Mistura Sennæ.

℞

Infusi Sennæ.
Aquæ Pimentæ â. â. ℥i
Tartratis Potassæ ʒij
Tincturæ corticis. Aurant. ʒi

M.

ʒi—ʒij horâ quâque tertiâ.

Jalap is an active purgative, but not very certain. When the liver or stomach is deranged, it is liable to disagree, causing vomiting, griping, &c. &c.; but from its wide range of action along the middle tract of the intestinal canal, quickening the peristaltic action, while it excites the serous secretions, it is very serviceable with children, as it well clears out the bowels, when overloaded; and is hence the best purgative we can select for emptying the intestinal canal, in those cases of illness, brought on by surfeit or over feeding. Toasting jalap lessens its liability to cause vomiting and colicky pains; while the addition of some drops of oil of lemon, and trituration with sugar, removes the nauseous taste. The watery extract is, from its mildness, well suited to children; but the pure resin triturated with almonds and sugar into the form of emulsion, or dissolved in spirit and blended with syrup, (as recommended by Dr. Coxe,) purges even in small doses, plentifully, with little disturbance. Jalap may be combined with any of the other purgatives; but ipecacuan is a very beneficial adjunct, as it adds to the purgative power of the jalap, without losing its own peculiar action. Such a combination is especially suitable when we want a purge during the existence of inflammation of the chest. Calomel quickens the action, and is often added. From two to five grains of jalap may be added to each dose of the powder of ipecacuan and calomel, already prescribed; or the following formula adopted: *

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* The Montpelier hospital has a convenient formula for purgative biscuits, containing jalap, (not unlike the old English jalap ginger bread,) which we subjoin, being anxious to contribute our mite towards lessening the miseries of the *nursery*, caused by physic-taking.

"Take an ounce of flour, and an ounce of sugar, two eggs, and one drachm of powder of jalap,—let three biscuits be made, a quarter of one of which will contain 5 gr. of jalap; and may be taken once or twice a day, according to the effect."

No 31.

Pulvis Jalapæ et Ipecacuanhæ.

℞

Pulveris Jalapæ ʒss
——— Ipecacuanhæ gr. v.
Submur. Hydrarg. gr. v.
Sacchari albi gr. x. M.

gr. ij—v. horâ quâque tertiâ.

When our object is to produce serous discharges from the bowels, and so to keep up depletion, jalap, in combination with some saline purge, is generally chosen; and crystals of tartar, as in the compound powder of jalap, is one of the best, and is often required in the treatment of children's complaints, particularly when of a dropsical character.

When in addition to serous discharges we wish to act energetically upon the bowels, so as to move them when constipated, or produce counter irritation (the head being engaged) we generally have recourse to scammony.

Scammony is a most energetic purgative, but liable to gripe and irritate the mucous membrane highly: hence care must be taken in the mode of prescribing and combining it. When given in powder it must be reduced to the minutest state of division and an aromatic always combined: the addition of a neutral salt, or alkali, is particularly advantageous, or a few grains of scammony may be blended into an emulsion with a sweet almond and new milk. Scammony, though so liable to disagree, is often required in the treatment of children's complaints, when the bowels are difficult to move, or loaded with mucus, which prevents the action of other purgatives, but which scammony in particular seems to possess the power of removing; hence its utility in obstinate constipation, the removal of worms, &c. &c.

No. 32.

Pulvis Scammonii cum Cretâ.

℞

Pulveris Scammonii ʒss
——— Cretæ prepar. gr. xv
——— Aromatici gr. v M.

gr. ij—gr. v. horâ quâque tertiâ.

One of the most effectual and yet mild purgatives that we are acquainted with, is a combination of rhubarb, scammony, and sulphate of potash, in equal parts, to which an aromatic may be added.

No. 33.

Pulvis Scammonii et Rhei.

℞
Pulveris Rhei
——— Scammonii
Crystal. Sulphatis Potassæ ā ā gr. x
Optime tere simul et adde
Pulveris Aromatici gr. v M.

gr. iij ad gr. vi horâ quâque tertiâ ad effectum catharticum.

The "Huile Purgative" of Swédiaur is a mild yet active form, for exhibiting scammony, and is conveniently given to children in emulsion, according to his formula, as follows:

No. 34.

℞
Scammonii ℈i
Olei Amygdalarum ℥i
Solve caloris mitioris ope et adde
Emulsionis Arabicæ ℥i
M.

ʒi—ʒii horâ quâque tertiâ.

Aloes is not often given to the young child, from the bitterness of its taste, and its liability to gripe: however, there is no purgative that, if judiciously employed, is more useful. It combines a tonic, as well as purgative power, in virtue of its bitterness; it has a particular relation to the liver, either as a substitute for bile, when deficient, or as passing through the liver, and so causing its flow; and it is well known, from its action on the rectum, to be peculiarly hostile to ascarides. The taste of aloes is well hidden by combination with extract of liquorice, and perhaps there are few medicines to the taste of which children sooner become reconciled: of its various preparations, the compound decoction, and the vinum aloes, are those best fitted for administration to the child.

No. 35.

Mistura Aloëtica.

℞
Decocti Aloës compositi ℥iss
Extracti Glycirrhizæ ʒij
M.

ʒi—ʒii bis terve indies.

In cases where the head threatens to be engaged, without inflammatory action being present, particularly in children of a leucophlegmatic habit or lethargic tendency, this mixture, as a derivative purgative, is the best we can employ—as also when we wish to expel ascarides. Its anthelmintic powers will be much enhanced by the addition of half a drachm or a drachm of the muriated tincture of iron. Aloes, when used as an anthelmintic, may be employed in the form of suppository or ointment. The following suppository is recommended by Swédiaur; and the ointment is used in the German hospitals by rubbing a small portion round the navel, in cases of colic, connected with worms.

No. 36.

Suppositorium Anthelminticum.

℞

Pulveris Aloës ℥ss
Muriatis Sodæ ʒiij
Farinæ ʒij
Mellis q. s. ut ft. massa.

M.

Instar mucis, in formâ suppositorii, utendum.

No. 37.

Unguentum Anthelminticum.

℞

Pulveris Aloës ℥i
Extracti Fellis Bovini ʒij
Unguenti Simplicis ℥i

M.

Ft. unguentum.

When the bowels are obstinately costive, purgative enemata must be had recourse to: care is required, however, in administering them to the child, as mechanical injury has been caused by their use. The tube is to be introduced cautiously, inclining its direction slightly towards the left side, while we soothe the child whose cries or struggles would so much impede the operation; the fluid is to be injected slowly, or at intervals, so as gradually to distend the bowels, and thus penetrate far up the intestines, without causing too great or sudden distention thereof. In children the intestinal tube readily dilates, and if over-distended soon loses its contractility; the more so the younger the child, so that great inconvenience or even danger may arise from over-distention caused by injection of too large or too frequently repeated enemata; as Guersent has justly pointed out, and as we have seen. Four ounces of fluid are the most that should be administered to an infant, and not more than six ounces, until after five years of age, nor is it necessary that an enema should exceed eight ounces during the period of childhood.

In cases of obstinate constipation, however, or where intussusception may be suspected, solution of the bowels has been obtained from distending the canal by the gradual introduction of some bland fluid, or even by inflation with atmospheric air.

The following is a good general formula :

No. 38.

Enema Purgans.

℞

Decocti Hordei ℥v
Muriatis Sodæ ʒiii
Olei Olivarum ʒv

M.

A drachm or two of spirits of turpentine may be added, if much flatulency be present. The cautious introduction of the tube far up the bowels, so as to allow the flatus to escape, is an important measure of relief in such cases: the distress thus caused, at times amounting to such a degree as to threaten suffocation. We have occasionally been able to confer great benefit in preventing the accumulation of flatus, by allowing the ivory pipe (detached from the tube) to remain in the anus.

CHAPTER VII.

ACCIDENTS AND DISEASES OCCURRING AT THE PERIOD OF BIRTH, OR SHORTLY AFTERWARDS.

The infant at birth may labor under certain morbid conditions, or it may suffer from accidents or diseases either peculiar to the first moments of existence, or materially modified by the circumstances belonging to that period. These are usually first noticed by the accoucheur, and require to be considered *separately*, in a systematic treatise on children's diseases, both on account of the great danger attending many of them, and also of the peculiarities which remove them from under the rules applicable to diseases of the same name in the general practice of medicine and surgery.

Of the importance of these affections of early infancy, we may judge from the great improvement that takes place in the probability of life after the season of their occurrence has gone by. Thus, according to the Northampton Tables, we find that out of 1,000 persons born at the same time, the probability is, that 257, or more than one-fourth, will be dead at the close of the first year; while of the remaining 743, but 118, or less than one-sixth, will be dead at the close of the second year.* The Annual Reports of the Registrar General of births, deaths, and marriages also show, that of the deaths, at various ages, registered in England and Wales, during the two years ending June 30, 1839, 216·29 per 1,000 (more than a fifth) occurred under the age of twelve months; while only 126·6 per 1,000 (about an eighth) occurred in the second year.

In the present chapter we shall include notices of a number of these ailments which are not susceptible of nosological arrangement, having no connection with each other, except their occurrence at the same early period of life; and we purpose, in doing so, to limit our observations to peculiarities belonging to that period, and, so far as possible, to avoid occupying our pages with discussions upon general principles of medicine, when these require no variation to suit them to the case in hand.

I.—STILL-BORN CHILDREN (ASPHYXIA NEONATORUM).

Children are occasionally born in a state of asphyxia, and without active interference upon the part of their attendants, would be certainly lost. The causes of this state are natural feebleness of constitution, existing to such an extent as to render the infant incapable of spontaneously making the muscular exertion necessary for the commencement of respiration,—or similar incapacity produced by long continued pressure upon the brain,—or interruption of the fœtal circulation by compression of the funis, before respiration has been established. To these causes, Dr. Edward Jörg, in his ingenious essay on the fœtal lungs, has added the circumstance of a too rapid and easy delivery, which fails to produce such a degree of compression of the placenta, and obstruction to the fœtal circulation, as he supposes to be requisite for making the system feel the necessity of respiration.†

The state of asphyxia may exist in a greater or lesser degree; the child may be completely still-born, with no indication of life except, perhaps, the pulsation of the funis, or a feeble action of the heart; or it may make ineffectual efforts at breathing, or even cry faintly, and yet subsequently perish, from want of strength to establish perfectly, the process of respiration. Under all these circumstances a good deal can often be effected by art: and we are encouraged to persevere in efforts at restoring animation, both by experience, and by reasoning upon the fact that the less heat an animal produces, the longer it can exist under a condition of asphyxia. We have already seen,* that the heat of the new-born child is about 3° less than that of the adult; and hence we have an explanation of what experience proves,—viz., that it can exist longer without respiration. In every instance, therefore, in which we have not positive evidence of the child's being dead, in the existence of putrefaction, or such malformation as is incompatible with life, we should give a fair trial to the means of restoring suspended animation, presently to be spoken of. What length of time is sufficient for a fair trial cannot be exactly specified, as it must depend upon the degree of asphyxia, and upon the progressive success attending our efforts. As long as the slightest attempt at motion of the respiratory organs is evinced, or the least pulsation of the heart continues, we have good grounds for persevering, in the hope of ultimate success, and we shall, probably, be stimulated to a longer continuance of our exertions, if we recollect that cases are upon record, in which infants have been resuscitated even after having been buried in the earth for several hours.† A remarkable instance of this tenacity of life once fell under our own observation in the case of an immature child, which having come into the world by the process of *spontaneous evolution*, underwent so much compression as produced complete asphyxia. As the child retained no signs of vitality, it was placed in a corner of the apartment, without being separated from the placenta, (which was expelled along with it,) and allowed to remain exposed to the cold air for nearly an hour, when, upon an accidental examination, the heart was found to beat feebly, and proper means being employed, resuscitation was effected, and life prolonged for twenty-four hours.

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* Macculloch's Dictionary of Commerce.

† Die Fœtuslunge im Gebornen Kinde, &c. von. Ed. Jörg. Grimma, 1835.

The treatment of still-born infants must be, in some degree, regulated by the cause of the asphyxia which, as we have already stated, varies in different cases and is accordingly attended with different symptoms. Thus we may have the naturally feeble infant, with pallid face and lips; open flaccid mouth; relaxed limbs; and cord pulseless, or beating feebly; or we may have the full, large, and, as it were, plethoric child, in which the face is swollen and purple, and the cord tense and pulsating strongly; indicating the presence of a condition somewhat approaching to that of apoplexy. These two conditions are, by some, denominated respectively, *asthenic* and *sthenic*, and will, of course, require some variation of treatment; but, in either variety, our first object should be to remove every obstruction to the passage of air into the lungs. For this purpose, we place the child with the mouth uncovered, and pass our finger into the fauces, for the purpose of removing any mucous or other matter which may obstruct the access of air, and also to tickle those parts, and thereby excite respiratory movements. With the latter object in view, we should also rub and gently slap the chest, and expose it, for a short time, to the stimulating operation of the cold air. If these means do not succeed, we must further stimulate the thorax, and soles of the feet, by friction with spirits, and irritate the nostrils and fauces with a feather dipped in the latter; or by holding hartshorn, or carbonate of ammonia to the nose.

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* See p. 47.

† Johannes Bohn de renunciatione vulnerum, &c. Lipsiæ, 1755

The foregoing steps are proper in both forms of asphyxia, and may be taken before dividing the funis, which should not generally be done, as long as it continues to pulsate, unless respiration be fully established. If the child's face be livid and swollen, indicating congestion within the head, and marking the case as belonging to the sthenic species, it will be well to endeavor to relieve the circulation, by dividing the cord, and allowing some blood to escape from the umbilical vessels, before applying a ligature. If the blood flows freely, it shows that circulation is still active, and is an additional reason for perseverance. Should the funicular circulation have been obstructed before birth, or cease shortly afterwards, it will be most convenient to divide the cord at once, as we shall then have the management of the child more within our power, for the application of other means of resuscitation of which we are about to speak.

Two practices are invariably adopted with still-born children, after the separation of the funis—viz. inflation of the lungs, and the warm bath. These, when used with judgment, are unquestionably means of great power in exciting respiratory action; but when injudiciously employed or persevered in, we have no doubt, they frequently become agents of destruction. It is now well ascertained that there is no more certain and speedy means of destroying animals, than a brisk insufflation of air into the trachea; and therefore it is positively wrong to use any powerful mechanical means for this purpose, in the new-born child. The gentle filling of the lungs with air does, however, frequently excite respiratory movements, and also facilitates pulmonary circulation, and should therefore be cautiously practised. In doing it, no trachea pipe or bellows should, we think, be employed; but air simply blown into the mouth—the operator applying his own lips (with a bit of silk or muslin intervening for the sake of cleanliness) to those of the child. While doing this the head of the child is to be slightly drawn backwards; its nostrils must be held between the finger and thumb of one hand, and the fingers of the other should be placed upon the pit of the stomach, so as to prevent the air from passing into that organ. When the chest has been distended, it may be compressed gently with the hand, so as again to empty it, and the inflation may be repeated three or four times, or until the commencement of natural respiration is announced by a sneeze or deep sigh. In addition to the evil consequences likely to attend upon the force that would be excited by bellows or other apparatus for inflation, we may mention that insufflation of *cold* air, in the event of resuscitation, seldom fails to produce dangerous bronchitis; * a fact the knowledge of which furnishes an additional reason for employing the air that has been previously warmed in our own lungs. The disadvantage of using air already deteriorated by having been respired, is more than counterbalanced by the other advantages of this plan.

With respect to the warm bath, those who have frequently witnessed its employment with still-born children will recollect that when it does good it is at the first moment of its application: immediately upon plunging the child into it, respiration may be set a-going and a cry uttered; but if this does not occur at once, keeping the child longer immersed in the water will seldom prove successful. This is explained by the discoveries of Dr. Edwards,† who found that the lower the natural or artificial temperature of an animal may be, the longer it can exist in a state of asphyxia; but that, nevertheless, the momentary application of heat, as well as of cold, acts as a stimulus, and produces more forcible motions. Consequently, he says, "the immersion of a great part of the body in warm water, is frequently an efficacious means of re-animating a child just born without signs of life. As soon as motion is produced, or if it be slow in manifesting itself, it will be right to abandon a method the prolonged use of which would be fatal." The object, then, is to plunge the infant quickly into a bath hot enough to stimulate it (probably about 100°); and if respiratory motions be produced, to withdraw it, and continue the excitement of the surface by friction with dry, warm flannel; and when respiration is well established, to lay it in a warm bed. A prolonged immersion in warm water would have the effect of raising the temperature of the child, so as to render it less capable of enduring the state of asphyxia, and would also prevent access of air to the surface of its body, which is known to possess a powerfully vivifying influence. We may, sometimes, especially in the sthenic form of asphyxia, when the child's face is red and swollen, advantageously combine the stimulating action of cold with that of heat; by dashing the head with cold water while the lower part of the body is immersed in the warm bath. The same rule applies to this plan as to the simple use of the warm bath; it must not be persisted in if not immediately successful.

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* See Dublin Practice of Midwifery, p. 239.

† Op. cit. p. 288.

The researches of Dr. Edward Jörg, published in his work already quoted, show that our care for the establishment of perfect respiration is not to cease when we get the child to breathe so well as to enable it to live for days, or even weeks. It may survive so long and yet die from the effects of an imperfect filling of its lungs with air. Many cases of cyanosis, infantile bronchitis, atrophy, and even convulsions, owe their origin to a partial continuance of the lungs in their fœtal condition—a state to which Dr. Jörg has given the name of *atelectasis pulmonum.* Should the child, therefore, continue to breathe feebly, and show an inability to suck, after animation has been restored, we must endeavor to promote more perfect respiration by friction on the surface, and stimulate the intestines by an aperient of castor oil; or, if there be much mucus obstructing the bronchi, it may be advisable to excite vomiting by administering half a drachm of ipecacuan wine.

It is useless to speak of the employment of tobacco fumes, electricity, or enemata, as recommended by some writers in the treatment of still-born children: for the two latter there is no time, and the former is now deservedly expunged from the list of means of restoring suspended animation.

II.—DEFORMITIES—IMPERFORATE ANUS.

Several varieties of this morbid condition are to be met with. The anus may be simply closed by skin, or a membranous septum, at the termination of the rectum; or the rectum may terminate in a cul de sac, at a greater or lesser distance from the natural situation of the anus; or the anus may appear perfect, but an obstruction exist in the gut, at some distance within it. In other cases we have known the rectum to terminate by opening into the vagina; or bladder in the male subject. When there is no anus, the case is usually discovered early, and time given for deciding upon the steps necessary to be taken; but when the opening appears perfect, and the obstruction exists at some distance within it, we do not become aware of the circumstance until it is observed that no discharges can be procured from the bowels; or, perhaps, until vomiting of meconium takes place. As soon as our attention is called to the matter, in such a case, we must institute a careful examination of the anus by means of a probe or flexible bougie, and be guided in further steps by the result of the investigation.

The only relief that can be given will, of course, be by an operation; and the exact nature of this must depend upon the particular circumstances. If the anus be merely closed by skin, or a membrane, all we have to do is to make a sufficient incision with a bistoury, and prevent closure of the opening by the use of tents. If there be no vestige of the rectum, an attempt must be made to reach it by incisions with the scalpel; and if there be an obstruction in the gut at some distance from its external opening, its removal must be aimed at with the bistoury or trocar. By some it has been recommended to make an artificial anus in the groin in cases in which the gut cannot be found. The operation would be a very hopeless one; but a consideration of its merits, and of the exact modes of performing the other operations, belongs rather to the province of the surgeon, than of the child's physician, who, in that capacity, has merely to ascertain the nature of the deformity, and must draw upon his own general knowledge of surgery, or apply to another practitioner for the means of its removal.*

III.—IMPERFORATE VAGINA.

The labia occasionally cohere at birth, and sometimes the vagina opens into the rectum, or terminates in a cul de sac. Unless the closure of the labia interferes with the opening of the urethra, nothing is required, or proper to be done, during infancy; and the case belongs to the general practice of surgery. If the urethra be obstructed, which seldom happens, we must have the obstruction removed in whatever way may suit the individual case.

IV.—IMPERFORATE PENIS.

Deformities of various kinds occur in the urinary organs of the male. The urethra may be wanting, in which case there is usually concurrent deformity in the bladder; the anterior wall and corresponding portion of abdominal integuments being deficient, and the mucous membrane, with the mouths of the ureters, protruded through the opening. Examples of this deformity are to be seen in every museum, but are, of course, beyond the reach of remedial art. In other cases, the urethra is not carried through the glans, but terminates by an opening behind that body, on the under surface of the penis. This variety, which receives the name of *hypospadias*, is also irremediable, and is seldom of any importance during childhood, as the urine will usually find its way through the irregular passage. Sometimes, but rarely, the orifice of the urethra, or of the prepuce, will be found imperforate, and will require treatment. In the latter case, the operation of circumcision may as well be performed at once, and will remove all difficulty. In the former, the natural opening must be rendered pervious, if necessary, by a cutting instrument, and kept so by the regular introduction of a small bougie.

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* In a paper lately read before the French Academy of Sciences by M. Amussat, a successful case of operation for imperforate rectum is detailed, in which the safe establishment of the artificial anus is attributed by M. A. to the drawing down of the intestine, and securing of its mucous membrane by sutures, to the skin, so as to prevent the infiltration of fœcal matter between the extremity of the rectum and the wound in the integuments. In these almost hopeless cases, every hint is of value.—*Gazette Medicale*, *tom.* 3. [Note to Second Edition.]

Retention, or rather *suppression of urine*, may, and often does, occur in infants, without the existence of any malformation or disease whatsoever. We are often told, for example, twenty-four hours after birth, that no urine has been voided. In such cases, we should carefully examine the parts concerned, to ascertain if any physical obstruction exists, and also feel the lower part of the abdomen to learn if the bladder be distended. If it be, and that the external openings are free, we may introduce a probe or small bougie into the urethra for the purpose of removing any mucus, which might block up its canal. We do not recollect having ever found it necessary to introduce a catheter. Most usually the stoppage of urine is owing to its non-secretion; and this may obtain for many hours after birth, without any evil consequences. All we need to do is to place the infant for a few minutes in a warm hip-bath, and leave the rest of the treatment to nature.* Many deformities of the urinary and genital organs occur in both males and females, and are now and then dragged into a disgusting notoriety as instances of hermaphroditism. As these, however, have no practical bearings upon our subject, we shall not at present delay to notice them.

V.—SPINA BIFIDA.

By this term is designated a mal-formation of some part of the vertebral column, in which the spinous processes are deficient, and the contents of the spinal canal protruded in the form of a round, compressible tumor, containing fluid. In some instances this tumor is covered with integument; in others, it is divested of this, and presents a reddish fungous appearance. The place of its occurrence is most commonly in the lumbar vertebræ; but it may exist in any other part of the column, or in the sacrum. The size of the tumor varies from the bulk of a nut to that of the closed fist; or it may be even larger: at birth it is usually flat, owing to the compression which it undergoes while passing through the vagina, but shortly afterwards it is protruded by the passage of fluid from the spinal canal into its cavity, and is then in some instances semi-transparent. A paralytic or deformed state of the lower extremities frequently, but not constantly, co-exists with spina bifida. In some cases the fluid can be forced out of the tumor, back into the canal, and the margin of the bony opening felt through the integuments; but pressure of this kind will usually produce convulsions. In a case which we lately saw, the integuments appeared as if cut by a sharp instrument round the base of the tumor, which was itself quite destitute of skin, and presented a reddish appearance, resembling the fungus which we occasionally see occupying the situation of the brain, in what is termed an acephalous fœtus. The prognosis in spina bifida is very unfavorable—the tumor commonly sloughing and bursting soon after birth, and occasioning immediate death; or the child perishing early in convulsions. Instances, however, are upon record in which the patients have lived for months, and even years; and Sir A. Cooper has published two cases, in which he effected what may be termed cures.* The plan which he adopted was, in one case, the continued employment of pressure by means of a concave mould of plaster of Paris, lined with lint, and held on by a roller, until at length the tumor could be altogether reduced within the spinal canal, when the opening was permanently protected by a suitable truss. In the other instance, repeated punctures with a needle were made at intervals, in the tumor, and the fluid drawn off, pressure being in the mean while applied by means of a piece of pasteboard and a roller. By these means adhesive inflammation was excited in the coverings, and the opening thereby permanently closed. More recently M. Dubourg has related two cases in which he effected perfect cures by amputation of the tumor and subsequent application of the twisted suture, so as to bring the edges of the divided skin into apposition. In the performance of the operation, M. D. attaches much importance to the preventing, so far as is possible, the escape of the spinal fluid, or the entry of air into the spinal canal.†

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* A curious case of retention of urine and diseased bladder, in a new-born infant, dependent upon an encysted tumor in the pelvis, will be found in the second volume of the *Medical Press*, p. 386, related by Dr. Peebles of Dublin. [Note to 3d Edition.]

In managing these cases shortly after birth, our chief object should be to protect the tumor from any pressure or irritation, which might occasion inflammation and gangrene, as instant death is to be dreaded from bursting of the sac. At a subsequent period we may cautiously try pressure; or if that cannot be borne without producing convulsions, repeated punctures with a needle, as practised by Sir A. Cooper, may be attempted, and the bulk, perhaps, by that means, reduced so much as to admit of a truss being applied.

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* Med. Chir. Tran. vol. ii.

† See *Gazette Medicale*, also *Medical Press*, vol. vi. p. 117.

Spina bifida is occasionally complicated with hydrocephalus, and sometimes tumors of a nature precisely similar to it are met with upon the head—the fluid passing out, in a sac of dura-mater, through an opening in one of the cranial bones. The same principles of treatment apply to these affections as to actual spina bifida.

VI.—SHORT FRENUM LINGUÆ (TONGUE-TIED).

The frenum linguæ is sometimes so short, or its attachment to the tongue extended so near to the tip, as to interfere with the motions of the organ in sucking or speaking. Nothing is more common than to have infants brought to us, alleged to be tongue-tied, and yet the existence of the malformation, to an extent requiring artificial aid, is extremely rare. If the tip can be protruded beyond the lips, nothing need be done, as sufficient motion will then be permitted to allow of sucking, and the frenum will gradually lengthen as the tongue comes to be more employed. The division of the frenum should, therefore, not be wantonly performed, especially as it is not altogether unattended with danger—instances having occurred of serious hæmorrhage; and even of suffocation from a turning back of the loosened tongue to such an extent as to impede the access of air into the glottis.* When interference is absolutely necessary, a very slight nick with a sharp scissors is all that will be required. The mode of operating is, to place the two fore fingers of the left hand under the tongue, on each side of the frenum, and to raise it as much as possible from the floor of the mouth; then with the scissors in the right hand to divide the edge of the frenum, taking care to direct the points downwards, so as to avoid injuring the ranine arteries. The child must be watched for a little, lest hæmorrhage should occur; and it is to be recollected that the blood may pass down into the stomach, and a considerable quantity be lost without the issue of any from the mouth.

VII.—HARE-LIP.

The consideration and treatment of this deformity belongs to the surgeon—all that the child's physician, as such, has to do with it, is to consider *when* the operation should be performed. If the child can suck, it is better not to submit it to the hazards of an operation in early infancy. But cases occasionally occur in which such a degree of deformity exists as to demand immediate assistance, in order to give the infant a chance of life. The nature of the operation, and modes of performing it, belong altogether to the province of surgery.

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* Petit. Mem. de l'Academie des Sciences.

We occasionally meet with a child born with one or more teeth, which may require to be extracted in order to prevent injury to the nurse's nipple: but if they be not productive of the latter effect it is wiser not to meddle with them, as by extraction, we may do permanent injury to the rudiments of the second tooth, which is buried in the gum beneath that which we remove.

VIII.—DEFORMED FEET.

Three varieties of deformity of the feet are to be met with. These are termed—*valgi*, when the foot is turned outwards; *vari*, when it is turned inwards; and *pes equinus* when the toes are pointed downwards, the foot being extended so as to cause it to approach to a right line with the leg. The immediate cause of these deformities appears generally to exist not so much in the bones, as in the muscles which influence the motions of the foot—any alterations observable in the former, in old cases, being probably often consecutive. Delpech found that, upon dividing the tendo Achillis in young persons who had died subject to one of these malformations, it became easy to restore the foot to its natural position, no trace of deformity remaining. Accordingly, he inferred that the primary alteration is a shortening of the gastrocnemii and other extensor muscles, and that the distortion primarily produced is the *pes equinus*, or extended foot: that subsequently the *varus*, or turning of the foot inwards, is easily induced, because the posterior extremity of the os calcis is naturally inclined a little in that direction, and the distortion is favored by the ordinary action of the gastrocnemii upon that bone, tending to bring the foot somewhat inwards. As the turning inwards increases, the plantar muscles, ligaments, and aponeurosis, are gradually contracting; and the deformity becomes greater, until first the external margin, and subsequently the dorsum of the foot, comes to be the part resting upon the ground.

The *valgus*, or turning of the foot outwards, so as to make a resting place of the inner margin, is not so common as the other deformities. It is produced by a shortening or inordinate contraction of the muscles situated on the anterior and external surface of the leg, whose office is to rotate the foot outwards.

The remote cause of these deformities, M. Delpech refers to an original defect in the nerves supplying the limb, in consequence of which there is a want of balance in the development and action of the antagonist muscles. His view is borne out by a fact which we have already stated, viz.: that spina bifida, which, of course, must often involve a lesion of those nerves while in the spinal canal, is frequently complicated with deformed feet.

The treatment of deformed feet must be based, in principle, upon the view we have taken of the immediate cause. Our object must be gradually to extend the muscles, whose shortness or inordinate contraction produces the distortion; and as far as possible to encourage the action of their antagonists. The first object is to be attained by mechanical contrivances, in the nature of shoes, adapted to the foot in such a way as to tend gradually to bring it into its natural position. The form of shoe required will vary according to the kind and degree of distortion, and its construction must depend upon the ingenuity of the surgeon and the instrument maker.* The principle of its application should be to make the extending force very gradual, and to apply it so as to act upon the shortened muscles: particular care should be given to the prevention of any injurious pressure upon the part which is made the *point d'appui.* The action of the antagonist muscles should be encouraged by friction, and by daily moving the foot in the directions in which these muscles would naturally act.

The period most favorable for the removal of all these deformities is early infancy, the parts being then most flexible and susceptible of alteration in position, and the patient most easily managed. In more advanced life, the rigidity of the muscles is so great, as usually to frustrate any attempts at elongating them; and under these circumstances, M. Delpech has recommended, and successfully practised a division of the tendo Achillis. Our business, however, as child's physician, is to recommend the early employment of curative means; and if these be properly adopted upon the principles just suggested, there will, probably, be no occasion for any more violent expedients.†

Supernumerary toes and *fingers* will sometimes be met with in an infant, and perhaps so situated and attached as to make their removal desirable. We would not, however, recommend an operation for that purpose in early infancy. The child is then little able to endure the shock of any operation, however slight; and as this is not a necessary one, it will be better to defer it for a few months.

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* For a description of an excellent form of shoe for *vari*, see Professor Colles's valuable paper in the first volume of the Dublin Hospital Reports.

† For full information respecting these deformities, we may refer to "L'Orthomorphie par J. Delpech, Paris, 1828;" to Professor Jörg's "Ueber Klumpfüsse und eine leichte u zweckmässige Heilart derselben, Leipzig, 1806;" and also to Professor Scarpa's "Memoire sur la torsion congénitale des pieds des enfans, &c. traduit per J B. F. Leveille, Paris, 1804."

[We may also direct our readers to the 1st, 2nd, and 3rd vols. of the *Medical Press*, *passim*, for several interesting disquisitions upon Delpech's operation, to which attention has been recently re-directed by M. Strohmeyer. Note to 3d Edition.]

IX.—NÆVI MATERNI, (MOTHER-MARKS.)

The new-born child may labor under a variety of organic malformations in the texture of the skin, all of which are classed under the name of *nævi*, although they differ very materially from each other, both in degree and nature. The most common forms of nævus are the brownish mole, and the claret stain. These are frequently met with upon all parts of the body, and vary very much in size. They appear to be simple discolorations of the skin, occasioned by an alteration in the structure of the rete mucosum. They are not much elevated above the rest of the surface: and as they commonly remain stationary during life, without causing any injury except from their unsightliness, it is better not to meddle with them. We know of no means whereby they can be removed without the danger of leaving a greater deformity in their stead, and therefore think it wiser not to interfere.* All these marks are attributed, but without any good foundation, to effects produced upon the mother's imagination during pregnancy, and accordingly they are usually likened, by the aid of an active fancy, to objects for which she has longed, or by which she has been frightened, as fruits of various kinds, mice, spiders, or other disgusting animals.

Other nævi exhibit a more important alteration of structure, being raised in granulated tumors above the skin, and consisting of a congeries of vessels, sometimes venous and sometimes arterial, imbedded in a sort of parenchymatous tissue, and often identical in their nature with the disease termed 'aneurism by anastomosis.' The color and external characters of these tumors vary considerably,—being sometimes dark blue, or livid; in other instances of a vermilion hue—occasionally raised on a neck or pedicle, and again growing from a broad base. Their size and situation are also very various—not being always confined to the skin, but appearing at times in the tongue, lips, labia pudendi, &c. A particular disposition to their formation appears to exist in some individuals, and we have seen so many as sixteen upon the body of a young child. Some nævi, like simple moles, remain stationary during life, and do no injury; others show a constant tendency to enlarge, which is much stimulated by any trifling irritation, as a bruise, scratch, or slight pressure. Any circumstance which quickens the circulation, as anger, warm weather, or active exercise, may increase their bulk and heighten their color, by producing a greater determination of blood to the surface; and the skin covering them being usually very thin, they frequently burst, and may occasion alarming, or even fatal hemorrhages.

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* Dr. Fränkel, in his German translation of this work, mentions a proposal for the treatment of this form of nævus, which was communicated by Dr. Paulli of Landau to the meeting of German Naturalists and Physicians, held at Stuttgart in 1834. Dr. P.'s plan consists in tattooing the nævus with needles and a *white* pigment, in a manner similar to that adopted by the South Sea Islanders, and often by sailors of our own country. Dr Fränkel states that Dr Paulli succeeded in this operation in several instances. The tattooing must be proceeded with gradually, and caution observed not to make the punctures too deep. We are not aware of the nature of the pigment used. [Note to 4th Edition.]

When nævi are small in size; in situations unlikely to suffer from pressure; and show no tendency to enlarge, they call for no treatment; but when opposite conditions exist, surgical aid is required, and must often be had recourse to even in very young infants.* The principles upon which this aid is to be afforded are threefold.

Their growth may be restrained by the continued application of cold washes, and the gentle pressure of a bandage; or inflammation may be excited in them by various means; or lastly, they may be extirpated by the knife or ligature. The first-named plan has the sanction of Mr. Abernethy's recommendation; but still can scarcely be looked upon as more than palliative, and, so far as the bandage is concerned, is inapplicable to many cases of the disease, both on account of local situation, and of the likelihood of severe irritation being occasioned by pressure.

For the production of inflammation various means have been devised: caustics of different kinds were applied by the old surgeons, and by producing ulceration, occasionally destroyed the disease. But this practice was often followed by considerable irritation, and sometimes by dangerous hemorrhages, and is now in a great degree laid aside. It was, however, in some measure consonant with the plans of nature, as we have seen many cases of large nævi in which ulceration set in spontaneously, and the whole disease was removed, leaving a healthy cicatrix. Latterly it has been recommended by Mr. Hodgson, of Birmingham, to vaccinate nævi; and in some instances, this plan has been productive of good effects. It has also been proposed by Dr. M. Hall to pass a couching needle into the centre of the tumor, and by moving it from side to side, to break down the vascular net-work of which it is composed; by repeating this process at intervals of a month or six weeks, he has found a gradual diminution to be occasioned. In other instances a seton has been drawn through the nævus for the purpose of exciting inflammation; a modification of which plan, viz., to pass twelve or fourteen threads through it at different points, has been recommended by Mr. Adams, of this city, and has been found to answer very well.

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* For a case of extirpation of a nœvus six hours after birth, by Mr. Baldy, see Med. Chir. Review, vol. viii. p. 204.

Where every part of the disease can be removed by the knife, it is, perhaps, the least severe plan, and likely to be attended by the slightest mark; but if it cannot all be taken away, there is considerable danger of hæmorrhage, and of a further growth of the tumor. Ligatures have been employed in several ways, viz.; by applying a single ligature round the tumor, where that was practicable; or, by passing a double thread through its substance, and tying the tumor in two portions: or, what we believe to be a very useful plan, by passing five or six common sewing needles through the skin contiguous to the nævus, and bringing out the points (also through the skin) on the opposite side, so as to make the needles cross each other in the form of a star, and then winding a ligature tightly under them in the same manner as is done in the operation for hare-lip, or in securing the vein of a horse after bleeding. By these means an artificial pedicle is formed for the nævus, and sufficient pressure may be applied to cause it to slough away.

X.—RUPTURES (HERNIÆ).

The new-born infant is liable to several forms of hernia, and in some individuals there appears to be a remarkable predisposition to the disease. We know a family of three children, in each of whom there existed at birth an umbilical hernia—in one combined with a single, and in another, with a double scrotal rupture.

The form of protrusion which we most commonly meet with is the *omphalocele*, or umbilical hernia. In the early fœtus we are to recollect that there is naturally a pouch at the commencement of the umbilical cord, which contains convolutions of intestine, and that these are not retracted within the abdomen until some months of fœtal life have elapsed. In the perfect state the opening at the navel should gradually close, until at birth it should only be capable of admitting the passage of the vein and arteries; but in many instances such perfect closure does not take place—a round, well-defined opening is left in the *linea alba*, and through this a sac of peritoneum, containing a hernia, may protrude. The protrusion may vary very much in size and contents, but commonly it ranges from the bulk of a hazel nut to that of a walnut, and contains intestine or omentum. The diagnosis is simple: we find a tumor at the navel, which increases when the infant cries or coughs, and can be replaced when we relax the abdominal muscles, and use gentle pressure, an empty pouch remaining; and an aperture, into which we can insert the point of the finger, being perceptible in the wall of the abdomen. Instances are upon record, in which the liver and other viscera formed the contents of an omphalocele, but most commonly there is merely a fold of intestine.

When the aperture in the *linea alba* is not very large, the prognosis is usually favorable; but much care and attention are required, both from the medical attendant and nurse. Until the funis has fallen off, and the navel healed, nothing more should be done than to apply a fold or two of old linen over the part, in the ordinary manner of dressing the child; but as soon as cicatrization is perfected, a more effectual course of treatment must be commenced, and the earlier this can be done, the better will be the chances of success. Our object is to keep the protrusion permanently within the abdomen, so as to permit a free scope to the natural efforts at closure of the opening. The means of effecting this are various. Spring trusses have been invented for the purpose, but are inapplicable, from their strength, to the tender bodies of very young children. Sir A. Cooper recommends a section of an ivory ball to be applied over the umbilicus, and retained there by adhesive plaster and a belt. The plan which we ourselves usually adopt, and find successful, is to apply a graduated compress, made of white leather spread with adhesive plaster, over the opening, and above this the common flannel roller or belly band. The apex of the compress, which is to be placed next the navel, should be as nearly as possible of the size of the opening; the compress should consist of three or four pieces,—the largest being about three inches in diameter,—and a double stitch should be passed through them, and knotted externally, so as to keep each piece *in situ*. We should always apply the compress with our own hands, as great care is necessary to insure a complete return of the hernia. Unless the child exhibits marks of uneasiness, it should not be removed until the plaster loses its adhesive quality, and then a new one should immediately be applied. In conducting the case, patience will be greatly exercised, as many months will be required for the completion of a cure, and this should be explained to the friends at the beginning. We have tried a plan, originally adopted, we believe, by Mr. Woodroofe, of Cork, and which answers well when there is a small opening with a considerably elongated sac, but cannot be employed in broad, flat herniæ; it is, after reducing the contents, to hold the pouch firmly between the fingers, and then wind round it a narrow strip of adhesive plaster, commencing as close as possible to the abdomen and continuing to the apex. This plan may succeed, by causing adhesion of the walls of the sac which will thus form a natural truss, and prevent protrusion through the opening in the linea alba. A rougher variety of this plan was sometimes practised by Baron Dupuytren, by tying a ligature firmly round the pouch, as close as possible to the navel. We would not, however, recommend this mode, as the cicatrix formed after the falling off of the strangulated portion of the pouch could scarcely be firm enough to resist future protrusion, and the operation would have no direct tendency to diminish the opening in the abdominal wall.

Inguinal hernia may also exist, at one or both sides, at the period of birth, and then constitutes what has been denominated *hernia congenita*. The distinctive character of this form of rupture is, that the protrusion descends into the sac of the *tunica vaginalis*, before the latter is closed, and thus comes to be in direct contact with the testicle. In many cases of congenital inguinal hernia, the testicle will not have descended from the abdomen; and into this circumstance we must particularly examine, by feeling for the testicle in the scrotum, as no truss should in any case be applied, as long as it remains within the belly.

The diagnosis of inguinal rupture is less easy than that of omphalocele, as it may be confounded with hydrocele, which is not uncommon in infants: or the testicle, while in the act of descending through the inguinal channel, may be mistaken for a hernia: after breech presentations, also, considerable tumefaction of the scrotum may exist, which should not be confounded with rupture. Hydrocele is to be distinguished from hernia by its transparency, and by our not being able to feel the cylinder of the intestine rolling under our fingers within the integument. The fluid may, however, be returnable into the abdomen as hernia is, and in like manner may be increased when the infant cries or coughs, so that caution is required in making our discrimination—the more so, as congenital hydrocele requires little or no treatment, usually disappearing spontaneously. The testicle is to be known by its solidity, and by not being usually returnable into the abdomen. The enlargement of the scrotum from pressure will be recognized from the history of the case, and will also, in general, rapidly subside.

The principle of treatment in inguinal hernia is, of course, to keep the protrusion within the belly, and favor the closure of the ring. The accomplishment of this, however, is attended with immense difficulty in the young child: the smallness of the pelvis renders it next to impossible to get any truss to fit; and in early infancy, the constant wetting of the straps will cause chafing of the skin, notwithstanding the most careful attention. On these accounts we have, after repeated and patient trials, almost given up the idea of using a truss before the child is a year old; and even at that age, we have been often foiled. A child subject to hernia should be kept in as tranquil a state as possible and every means adopted to prevent it from crying, or using any exertion likely to increase the protrusion. When this has been carefully attended to, and the parts bathed daily with cold water, we have often observed a spontaneous cure to be effected, without the employment of any artificial support whatsoever.

All the forms of hernia in the child may be the subject of strangulation, and require the operation, the performance of which is strictly within the province of the surgeon, and requires no remarks from us.

XI.—INJURIES RECEIVED DURING BIRTH.

When, in the course of tedious labor, an extraordinary degree of pressure is exerted upon any part of the child, all the consequences of a contusion may result. Bloody tumors may be formed upon the head, or face, or in the scrotum; or inflammation may be excited, which will terminate in abscess, or even gangrene.* To all these injuries, the ordinary rules of surgery apply: the bloody tumor should be left to itself, and never on any account opened, as unhealthy suppuration would be thereby induced; inflammation must be treated by the moderate use of cold lotions, as spirits or vinegar and water, and by preventing any continuance of irritation from pressure of clothes, or other cause; when suppuration or sloughing ensues, we must employ poultices.

Considerable alteration is sometimes effected during birth in the shape of the child's head; and in face presentations, the features are often frightfully disfigured; but neither of these cases require or warrant any interference; and it will be often a matter of surprise to ourselves, how very rapidly the parts will return to their natural state.

Fractures of the bones of the extremities † are sometimes produced during birth, especially in cases of preternatural presentation, when turning or other manual interference is required. They unite readily, and are to be treated upon common principles, only adapting our means to the delicate organization of the child—making our splints, for example, of Bristol board, instead of wood, and carefully preserving the skin from irritation. One thing we would recommend to the young practitioner in midwifery—viz. when such accidents unfortunately occur, never to think of concealing them, but at once to inform the friends, and explain the steps necessary for the occasion. This is the honestest plan, and we sincerely hope it will also be found to be the best.

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* The fœtus while yet in the womb is subject to many diseases, and among others to inflammation and its consequences. We lately had an opportunity of observing a remarkable instance of this in the child of a prisoner in one of the jails of this city, which was born with two large sloughing ulcers upon the fore arm. [Note to 2nd Edition.]

† It is asserted by Schmidt, Jörg, Klein, and others, that in severe labors, with disproportioned pelvis, fractures of the cranial bones may be produced by the force of the pains alone.

When pressure by means of a blunt hook or fillet, or in any other way, has been applied to the groin or axilla, such injury may be done to the nerves in these situations, as will be followed by paralysis of the limbs. Such an affection is probably altogether beyond the reach of remedial art, and it is unnecessary for us to consider it at any greater length, here.

XII.—BLUE DISEASE (CYANOSIS).

This term is applied to a morbid appearance of the skin, in which it assumes a blue, purple, or leaden color, and which is occasionally observed in new-born infants. The change of color is remarkable in the lips, cheeks, and nails, and is generally accompanied with reduction of temperature, and paroxysms of difficult respiration, during which the blueness becomes deeper, and is extended over the surface of the body—the pulse stops, the extremities become cold, and syncope resembling death often occurs. From these fits the child may recover, but usually to be again attacked, and ultimately to perish in one of them. Any thing which hurries the circulation,—as crying, or quick motion,—is likely to bring on a paroxysm.

The cause of these symptoms was attributed by Senac, Morgagni, and others, solely to a continuance of the fœtal condition of the heart—or in other words, to a permanent patency of the foramen ovale. Corvisart, however, observed the symptom of cyanosis in cases in which there was no communication between the ventricles; and Dr. J. Crampton has met with instances, in which there was no blue color, and yet the openings between both auricles and ventricles must have been unclosed for many years.* Other causes, therefore, must exist; and in new-born children, we conceive, it may often be accounted for by the imperfect filling of the lungs which we have already spoken of as having been noticed by Dr. Ed. Jörg. When the disease arises from organic imperfection, the prognosis is highly unfavorable, and nothing can be done by art;

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* See Med. Trans. Coll. of Physicians in Dublin, vol. i. *new series.*

yet the unfortunate subjects sometimes drag on a wretched existence for years, as in Morgagni's well-known case of the girl who survived to her sixteenth year with a foramen ovale so large as to admit of the passage of the little finger through it. When the symptom belongs to an imperfect filling of the lungs with air, we must have recourse to those means of exciting respiration indicated under the head of 'still-born children,' and may sometimes be successful in our efforts. During a paroxysm, all we can do is to sprinkle the child's face with cold water, and expose it freely to cold air.

XIII.—NINE-DAY FITS (TRISMUS NASCENTIUM).

This fatal affection is stated to commit great ravages among infants of all classes in warm climates,* but in this country, although occasionally to be met with in private practice, it may justly be considered as an hospital disease. Its ordinary period of occurrence is within nine days from birth,—about the time of the falling off of the funis, and it appears in two forms, distinguished by nurses as "black" and "white fits." The first of these is violent and rapid in its progress, terminating fatally in from eight to thirty hours; the second may be protracted to three, five, or even nine days.

Sometimes the disease sets in without any warning; in other cases there are certain premonitory symptoms, as whining and starting during sleep, twisting of the upper extremities, the appearance of a livid circle about the lips, sudden changes in the countenance, and compression and puckering of the mouth, accompanied with a peculiar screeching. The child's appearing to smile during sleep is also commonly considered as an indication of the approach of fits. An extraordinary greediness for food or suck, as if occasioned by inward pain, is sometimes observed. The stools may be regular and natural, or they may exhibit considerable derangement, being greenish, slimy, and knotted. When the paroxysm actually comes on, the infant is seized with violent, irregular spasms of the muscles, particularly of those of the limbs and face, recurring at uncertain intervals. In the "black fits," the muscular contractions are very violent; there is foaming at the mouth; the thumbs are turned firmly into the palms of the hands; the jaws are closed, and any attempt to separate them considerably aggravates the paroxysm; the face, and often other parts of the body are swollen, and of a dark copper color; during the interval the muscles retain a greater or lesser degree of rigidity. In the "white fits," there is not so much violence; the face is pale, and the body becomes quickly emaciated. Both are equally fatal.

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* It is also very fatal in the Westmann Islands, on the southern coast of Iceland. See *McKenzie's Iceland.*

With respect to the pathology of trismus, nothing is certainly known; but the researches of Dr. Joseph Clarke [*] make it highly probable, that a powerfully *predisposing cause* exists in a vitiated state of the atmosphere of large hospitals; and Professor Colles [†] has ingeniously put forward a suggestion, that this operates by inducing "an unhealthy or unkindly form of inflammation or ulceration" at the navel, and that the disease is in fact a species of traumatic tetanus, having its *immediate cause* in the wound occasioned by the separation of the cord. This view has, however, been impugned by Dr. Labatt, who has published particulars of some *post mortem* examinations in which no appearance, satisfactorily accounting for the disease, showed itself in the cord.[‡]

The views of Dr. Clarke led him to pay much attention to the prevention of trismus in the Dublin Lying-in-Hospital, by establishing a free ventilation, and perfect cleanliness in the wards; and his numerical statements, certainly, appear strongly to corroborate his opinions. They are also further borne out by the facts contained in Dr. Collins's book,[§] to which we may refer the student and statistician for much valuable numerical information upon this and other subjects connected with midwifery. Whether we can fully assent to the exact number of lives (16,371) said to have been saved by Dr. Clarke's suggestions, is a matter of very trifling importance; but we would strongly recommend that his principles with respect to ventilation and cleanliness, should be carried into effect, as perfectly as possible, in every lying-in institution. Professor Colles suggests as a preventive measure, in every case, the propriety of dressing the umbilicus with spirits of turpentine, from the birth of the infant; but the small average occurrence of the disease, especially in private practice, scarcely appears to demand such a step.

With respect to the treatment of trismus nascentium; when it has once set in, we believe that every thing is empiricism, and that little is to be expected from any plan. We have tried, or seen tried, almost every variety of treatment—mercury, leeching, blistering, opium, tobacco, &c. &c.—without any impression being made upon the affection; and we must candidly confess it is not in our power to propose any means with confidence. Dr. Breen,[‖] of this city, speaks encouragingly of the administration of an eighth of a drop of laudanum every second hour until narcotic effects are produced, together with "a grain and a half of calomel every fifth or sixth hour up to the third time; afterwards not more unfrequently than twice or three times in twenty-four hours, with intermediate doses of castor oil, in the quantity of a large sized tea-spoonful, sometimes joined with a third part of spirits of turpentine." Dr. B. has not found the warm bath productive of advantage.

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[*] Tran. R. I. Acad. vol. iii.

[†] Dub. Hos. Reports, vol. i.

[‡] Ed. Med. and Surg. Jour. vol. xv.

[§] Pract Treatise on Midwifery, by Robt. Collins, M. D. London, 1835. [Vol. XI. Lib. of Prac. Med. published by the Mass. Med. Soc.]

[‖] Dublin Medical Journal, vol. viii.

XIV.—INFANTILE ERYSIPELAS.

Inflammation of an erysipelatous nature sometimes attacks infants, especially those born in lying-in-hospitals. The disease in its worst form appears about the navel, or lower part of the belly (from which latter situation, it has sometimes been denominated *erysipelas pubis*); but it also frequently attacks the limbs, and particularly in the vicinity of joints, as the ancle and wrist.

It is a very dangerous affection, running quickly into suppuration or gangrene, and usually occurs at periods when the existence of other malignant diseases, as diffuse inflammation, puerperal fever, and scarlatina, prove the *constitutio anni* to be of a typhoid character. Its affinity with such affections is also further shown by the morbid appearances observable in fatal cases of the disease—the different cavities being usually found to contain effusions of curdy gelatinous lymph and serum, and the organs often exhibiting softening, and infiltrations of sero-purulent matter.

Infantile erysipelas first appears in the form of a dark red, shining spot, which quickly extends in size, and becomes of a purplish color; there is not a great deal of swelling, but the skin is tense and very hard. When it commences on the belly, vesications, destruction of the cellular tissue, and gangrene of the skin, quickly follow. The genital parts are not unfrequently destroyed altogether; and we have sometimes seen the scrotum become black and slough away, leaving the testicles bare and hanging loosely by the cords. In such cases, the fever is of a typhoid kind and very severe, usually carrying off the child in a very few days. The erysipelas which attacks the limbs, in the first instance, is milder in its nature; and although suppuration often follows, the prognosis is not so unfavorable as in that which commences upon the abdomen, as it less frequently runs into gangrene. Before the setting in of erysipelas, the bowels are generally deranged, the stools being offensive, slimy, and knotted. It often, however, makes its attack so speedily after birth, that we have not time to recognise any premonitory signs. The general symptoms during the existence of the disease are great restlessness and peevishness, diarrhœa with ill-conditioned motions, very rapid, feeble pulse, and, towards the termination, a state of coma.

The prognosis is very unfavorable, and yet (so little are we warranted in despairing of children under the most doubtful circumstances) we have seen a case recover in which the whole scrotum and skin about the pubes had sloughed away, the bare testicles being again covered up by an extension and cicatrization of the neighboring integuments.

In treating infantile erysipelas, we must hold in view the circumstances under which it occurs, and its usual course. It is commonly a disease of hospitals, and must therefore be presumed to have its predisposing cause in some impurity of the atmosphere; accordingly we should lose no time in transferring the child, if it be practicable, to a different and well-ventilated apartment: this we conceive to be an essential step in the treatment. From the usual course of the disease, its quickly running into gangrene, and the fever being typhoid, we learn the necessity of supporting the child's strength, at the same time that the gastric derangement demands from us a careful attention to its bowels. Should the mother not have sufficient milk, or not be free from disease, we must at once procure a wet nurse; and if the child be unable, or disinclined to suck, a tea-spoonful of white wine whey must be administered every hour or half hour. An alterative aperient should at once be given; and when it has operated, small doses of quinine (one-third to one-fourth of a grain) every three or four hours, in conjunction with one-fourth of a grain of aromatic powder. Ammonia has been recommended by some; but we think the wine whey a better stimulant, as combining also nutritive matter. With respect to local treatment; in the first instance, we probably cannot do better than to dust the part with starch-powder or common flour; and subsequently, when suppuration or gangrene is approaching, most relief will be given by warm fomentations and light poultices, as of bran or chamomile flowers; or the fermenting poultice. When matter is formed, incisions will be required in order to give exit to the sloughing cellular membrane, and prevent, as far as possible, further destruction. Underwood and Burns recommend, as local treatment, compresses of linen wrung out of camphorated spirits; but we rather think we have seen more benefit result from the use of warm applications. Perhaps, when the disease attacks the limbs, it would be advisable to try a modification of Mr. Higginbottom's plan in erysipelas, by drawing, with a pencil of lunar caustic, a sort of cordon round the diseased part. We cannot speak from experience of this suggestion; but it appears worth trying, especially as erysipelas when it attacks the limbs, is frequently of an erratic nature.

XV.—ABSCESSES.

We have frequently had occasion to treat large collections of matter in very young children, which, if the short course of life already permitted to the little patient did not forbid, we should be almost tempted to call chronic abscesses. These formations of matter we do not recollect to have seen noticed by any author; yet they are of very frequent occurrence. Their usual situation is in the axilla, neck, or lower part of the leg; but we have observed them in almost every part of the body. They set in and increase with little appearance of inflammation, and often attain a very considerable size, without having excited any general fever. We have sometimes given exit to a wine-glassful of matter from one existing in a child of a few weeks old. The disease consists at first of a tumor, apparently not very painful to the touch, until it approaches the surface, when the skin becomes inflamed, and a process of pointing commences. We can then satisfy ourselves, by the touch, of the presence of a fluid—and the sooner we give vent to it, by a small opening with a lancet, the better. The pus is sometimes fetid; at others healthy. After being opened, the abscess commonly gets well without any treatment, beyond the use of a poultice, being required.

XVI.—INDURATION OF THE CELLULAR TISSUE—(ŒDEME DU TISSU CELLULAIRE DES NOUVEAUX-NES; SKIN-BOUND DISEASE).

This appears to be a very common disease in the French hospitals, and extremely fatal; so much so, that in the years between 1808 and 1811 there died, in the *Hospice des Enfans trouvés*, 576 out of 643 who were attacked. In Great Britain, however, it is not by any means so common. It occurs during the first few days after birth, and in some instances the infant has been born with it. It usually attacks premature or feeble children, in whom respiration has not been fully established, and commences in the extremities—most commonly in the feet. These parts become somewhat swollen, dry, hard, and cold. The skin is sometimes of the natural color; at others, livid or purple. It appears as if stretched tightly over the subjacent parts, and is cold and hard, pitting slightly upon pressure. From the extremities the disease commonly proceeds, with rapidity, to the trunk of the body, the whole or parts of which it affects in like manner. The diminution in temperature is remarkable, and the body often appears to be acted upon by external heat merely as so much dead matter.

No febrile condition accompanies this affection, wherein it differs from infantile erysipelas, which in other respects it much resembles. The child will not suck, is restless, and continually whines in a manner compared by Dofmüller to the crying of young mice. Respiration becomes gradually more and more difficult, until death ensues, usually before the fourth day, but sometimes so late as the second or third week. The prognosis is very unfavorable; but in mild cases, the respiration sometimes improves, heat begins to be evolved, and recovery slowly takes place.

Post mortem examinations show the results of this disease to consist of an effusion of yellowish or greenish sero-albuminous fluid into the cells of the cellular membrane, both the subcutaneous tissue, and that which lies between the muscles. The peculiar hardness has been attributed by some to the coagulable quality of the effused fluid, which was analyzed by Chevreul; but we have the authority of Dr. Carswell* for stating that this quality does not exist in a greater degree in the serum in question than in that which constitutes the œdema of adults, and that further, it is not found in a coagulated state in the cellular tissue of children subject to this disease. It is probable that the peculiar hardness and tightness of the skin depends upon the condensation of the fat produced by the mechanical pressure of the effused fluid. All observers are agreed upon the constant existence of congestion in the large veins, and accumulation of black blood in all the viscera, as concomitants of this disease; which state, however it may be produced, sufficiently explains the diminution of temperature, serous effusion, and other phenomena. Other lesions, which are only occasionally observed, as an open foramen ovale, inflamed conditions of organs, &c., must be merely considered as accidental coincidences.

With respect to the remote cause, much difference of opinion exists. By Dr. Andry, who first *accurately*† described the disease, and subsequently by M. Dugès, it was attributed to cold. M. Breschet conceived it to depend upon an open state of the foramen ovale. M. Denis considered it to be an inflammatory affection of the cellular membrane. M. Billard assigns several predisposing causes, the most prominent being a natural debility of the child, which of course is merely an *asylum ignorantiæ*. It appears to us highly probable, that a frequent cause may be the imperfect filling of the lungs with air, at the time of birth, of which we have already spoken.

Treatment in so fatal a disease is, of course, the subject of much difference of opinion. The earlier plans had for their object the application of heat by means of the warm and vapor bath, and wrapping the child in wool or cotton. The lowness of temperature, however, is merely a symptom of the state of commencing asphyxia; and we have already observed that that state is not likely to be removed by the application of external heat alone. We must endeavor to lessen the venous congestion, and if we succeed in doing so, the production of heat will proceed naturally. For this purpose we would recommend friction with warm flannel; the administration of an emetic of ipecacuan, for the purpose of removing mucus and exciting respiration; and the internal use of stimulants, as warm wine whey. We cannot put forward this plan as the result of experience; but we conceive it to be based upon a rational view of the pathology of the disease. Palletta recommends leeches to be applied to the œdematous parts, as a means of promoting circulation; but his plan has not succeeded in other hands.

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* Cyc. of Pract. Med. article Induration.

† It was previously noticed by Drs. Denman and Underwood.

XVII.—JAUNDICE—(ICTERUS NEONATORUM, OR YELLOW GUM).

A more or less marked yellowness of the skin and tunica conjunctiva of the eye is a very common occurrence with infants of two or three days old. This, in ordinary cases, appears to depend merely upon the active commencement of the secretion of bile; more than is required for the uses of the digestive function being formed, and then disposed of by means of the skin and other excreting organs. Viewed in this light, it can scarcely be called a disease, commonly disappearing spontaneously, and requiring no medical treatment. When it does not go off in two or three days, we may set matters to rights by the administration of a drachm of castor oil, or two or three grains of rhubarb with one of hydrargyrum cum cretâ.

Jaundice may occur in a young child as the result of malformation or obstruction of the biliary ducts; but under such circumstances it is permament, and if there be an organic defect, cannot be removed, and will probably prove fatal.

The foregoing article has been criticised for its brevity, and we have been found fault with because "no mention is made of Böer's valuable observations on this subject;" (see Brit. and For. Med. Rev. No. VI.) We certainly had not read Böer's remarks, *Ueber die Gelbsucht neugeborner Kinder*, when we published our own opinions as above, but since then we have taken the trouble to examine them, and were not a little amused at finding that the "valuable observations" essentially coincided with our own, with the exception that Böer confesses that many children were killed, under his observation, by the use of *innerlicher Medicamente* before he discovered the harmlessness of this *change of color*, for it cannot be called *a disease*: "*Seitdem*," he says, with much naiveté, "*werden, ohne Vergleich, weniger Kinder krank, und wenn sie die Gelbsucht bekommen, so ist sie unbedeutend, von nicht langer*

Dauer, und weicht auf blosse äusserliche Behandlung." Böer, however, was not, as we were, content with leaving the matter to nature, but recommended clysters, baths, electricity, and frictions on the abdomen. We can only say, that our experience does not teach us to set any VALUE upon the adoption of such plans in a disease, "*unbedeutend*," and "*von nicht langer Dauer.*" The concluding passage of Böer's paper is so similar to our own that we are rather surprised at its not having given occasion to a charge of piracy rather than of omission—it is as follows:—"*Es gibt aber Gelbsuchten, die man nicht heilen kann, das sind jene, wo die Krankheit in einem organischem Fehler liegt, oder in einer mechanischen Abartung eines Theiles, oder in einer unauflösbaren Concretion.*" (Sieben Bücher über natürliche Geburtshülfe, Wien. 1834.)

Few authors, perhaps, have less reason to complain of reviewers than we have; but we felt it necessary to make the foregoing remarks in order to give us an opportunity of correcting an error into which some of our critics have fallen respecting the nature of this work. Our intention was to make it, as far as our humble abilities would allow, a strictly "Practical Treatise;" neither a compilation of all that was said or known respecting children's diseases; nor yet a history or bibliography of the subject. With this purpose constantly in view, we have endeavored, in all possible cases, to state the results of our own experience in our own words; and to these latter, notwithstanding the dislike expressed by some individuals to "popular expressions," it is also our wish to give as British a character as may be, and to shun, as far as in us lies, all foreign barbarisms, which, however fine and scientific they may be considered, appear to us to be the disgrace of the medical literature of the present day. When we could not refer to our own practical knowledge, or when we found the reasonable opinions of others to differ from our own, it has been our desire to withhold from no man his merit; and accordingly our quotations, we hope, have not been illiberal. We must now, however, once for all, disclaim any obligation, in a practical work, to father upon Underwood or Richter, Böer or Dewees, or upon any other names, opinions which are the common property of science, and which are known to us and to every other practical man, as well as to those who preceded us in making use of, not inventing them. Were we to adopt an opposite course, it is obvious that we should be writing a partial history of medicine, not a Practical Treatise, containing the results of our own experience and knowledge. [Note to 2nd Edition.]

XVIII.—PURULENT OPHTHALMIA OF INFANTS.

An inflammation not unfrequently attacks the eyes of newborn children, which is speedily followed by a copious secretion of pus from the conjunctiva, and, when neglected, often terminates in sloughing of the cornea, or permanent opacity of that tissue. This disease commonly sets in the second or third day after birth, and commences with increased vascularity of the conjunctiva lining the eye-lids, which latter becomes swollen and permanently closed. The inflammation soon extends to the conjunctiva of the eye-ball; the swelling of the lids increases very much, and a copious discharge of thick, white, purulent matter ensues. If we attempt to open the eye at this period, a gush of matter takes place, and, frequently, the lower lid is everted, exhibiting its internal surface highly inflamed and of a bright red color. In some severe instances, the tumefaction of the lids is so great as to cause eversion without its being the result of an attempt at opening the eye. We can seldom get a view of the cornea, as the intolerance of light is so great as to cause a turning upwards of the eye-ball upon every attempt at separating the lids.

Some difference of opinion prevails as to the cause of purulent ophthalmia. It is attributed by many solely to a specific infection communicated during the birth of the child; while by others it is supposed to be a species of epidemic; and others, again, attribute it to cold, or the stimulus of too much light. It is probable that any one of these causes may occasionally produce it; but our own experience certainly goes in support of its usually being the result of infection, as we have, in a large majority of instances, traced it to a gonorrhœal or leucorrhœal discharge existing in the mother before parturition. The prognosis is usually favorable, if the case be seen in time, and carefully attended to; but it has too often happened to us to be first called upon when sloughing or opacity had already taken place.

The treatment of purulent ophthalmia has been conducted upon very different principles by different practitioners. The violence of the inflammation has induced some to apply a leech to the lid or temple, in almost every instance, and to repeat the application as often as three or four times. We have, however, but seldom found it necessary to draw blood at all; and the most protracted examples of the disease, we have seen, have been those in which leeching was repeatedly employed. It has frequently appeared to us that the loss of blood by two or three leeches—(it is to be remembered that we are treating an infant two or three days old)—produces such general and local debility as favors very much a protracted continuance of the discharge, merely by causing relaxation of the inflamed vessels. It is only then, in an extreme case, when the inflammation is very rapid and violent, and the child strong, that we would venture upon the application of a leech. Our common plan is to employ astringent or stimulant collyria from the commencement; and by the use of these, and the most scrupulous attention to cleanliness, we have generally been successful in saving the eyes. The kind of collyrium to be used is not of great consequence. A very good formula is six grains of alum to an ounce of rose water; or three grains of sulphate of zinc to the same quantity of rose water. We generally prefer collyria of this description to those composed of nitrate of silver. Much benefit has, however, been derived, in chronic cases, from the use of a strong solution (say ten grains to the ounce) of the latter substance in distilled water. A drop or two of the collyrium should be introduced into the eye three or four times a day; and the discharge should be frequently removed by dropping from a sponge, or injecting between the lids, lukewarm water or chamomile tea. Without attention to cleanliness, and removal of the discharge in this way, any treatment we can adopt, whether energetic or mild, will be quite inadequate to the safe management of the disease. When the inflammation is severe, and the lids adhere strongly together, a poultice of bread and cold water enclosed in a muslin bag, and applied between the periods of washing, will be found of great service. The application of the solid nitrate of silver to the inflamed eye has been tried by some, and no doubt often with benefit; but we are never desirous in our practice of trying what *can* be done with impunity, but rather of safely removing a disease with the least possible artificial interference. In conjunction with the local treatment, we must attend to the condition of the child's bowels; and will generally perceive a necessity for aperients, and if the intestinal discharges be unnatural, for small doses of hydrargyrum cum cretâ as an alterative. Should the discharge begin to decrease, we must continue our attentions to cleanliness, and persevere in the use of the astringent collyria, as the disease is likely to relapse. Even when considerable opacities of the cornea remain, in severe or improperly treated cases, so active are the absorbents of the child, that we shall frequently find the speck gradually to disappear. Many cases of the purulent ophthalmia of infants depend upon the state of the constitution, and are, consequently, only removable by an improvement of the general health. We have known change of air or change of nurse, especially the former, to act like a charm in the cure of this disease.

The following remarks on this important subject will be read with the interest which attaches to every contribution to ophthalmic surgery, from the able pen of Professor Jacob:—

MY DEAR MAUNSELL,—You ask me to give my opinion as to the treatment of the purulent ophthalmia of infants, for insertion in the edition of yours and Dr. Evanson's book on Diseases of Children, now going through the press. This I can do without adding much to the bulk of your volume, or imposing much labor on myself. In fact the matter appears to me to be in a nut shell. If we can prevent or stop the slough, abscess, or ulceration of the cornea, whichever it is, or whatever we call it, we do almost all that is required, nature sooner or later does the rest. This, however, is the great difficulty, and I am skeptical as to our power to overcome it. As in other diseases, medical men, with great confidence and composure, attribute the successful issue to their treatment, when the recovery is a natural result, and, perhaps, even a result obtained by the operation of natural causes in defiance of the counteracting influence of art; I wish those who boast of their "*cures*" would have the goodness to let us know how many per cent. of this disease recover if not meddled with at all. If we knew why the cornea suffers this destruction in this complaint we might, perhaps, suggest a remedy with more confidence; but of this we are entirely ignorant, notwithstanding plausible theories and hardy assertions. We are told that this structure gangrenes or sloughs, because, its vitality being lower than surrounding parts, it cannot resist the consequences of that inflammatory action which other textures bear with impunity, which is, after all, a mere begging of the question. What grounds have we for assuming that vital functions are less energetically or effectually exercised in this piece of organization? On the contrary, we have good grounds for believing that its powers of life and growth are of the most active kind. In general inflammation of the eye-ball commonly called iritis, the cornea is more implicated than in this inflammation of the conjunctiva, yet we do not find it gangrene or slough. All we know, I believe, is that in this disease the cornea often suffers from gangrene, abscess, or ulceration, one, or both, or all three, and that the consequence is cicatrix or opacity, more or less destructive to vision.

As you have argued in a preceding paragraph, neither the results of the treatment, nor the reasoning upon which it is founded, are conclusive as to the value of blood-letting in this disease. We are prejudiced in favor of this resource in all inflammations, because we see its value in many; but I am sorry to say in inflammations of this mucous membrane, and, perhaps, of mucous membranes in general, we have no reason for being very sanguine as to its decisive beneficial influence. If an infant be vigorous and full of blood, I would apply a leech or two, and allow the bites to bleed until vascular action is enfeebled, but more with the view of reducing the inflammation of the lids, and thereby diminishing the tumefaction and consequent pain, than the hope of preventing the formation of the slough, abscess, or ulceration. On the contrary, if we are to look on the mischief, as gangrene or slough in the first stage, we have good reason for fearing that the debility produced by depletion may contribute to that consequence. It has been proposed—and many, I believe, practise it—to drop a strong solution of nitrate of silver into the eye even in the first or active stage of inflammation, with the view of preventing the sloughing of the cornea. How such an effect can be expected to follow such a cause, I cannot understand; but the advocates of the remedy will tell me they do not pretend to explain why it is so, but to state that it is so. Now this is not quite so certain as they suppose. That many babes escape blindness who are thus treated I admit; but whether they escape in spite of it, or in consequence of it, is another affair. If I had a child of my own suffering from purulent ophthalmia, I am sure I would not put strong solution of nitrate of silver into its eyes in the first or inflammatory stage.

I find it inculcated that the purulent discharge should be constantly carefully removed, and directions are given for syringing and wiping the lids to free them from it. If this advice be given from a belief that the purulent matter is injurious to the inflamed surface, or unfit to form a covering for it, the notion is surely a mistaken one. The purulent matter is nature's dressing, and the art of man has never invented a better or as good a one. It may, perhaps, give trouble from its accumulation, should the lids be glued up by its drying on their edges, but that it scalds or irritates the eye cannot, in my opinion, be admitted. It may be well, whenever the baby awakes, just to draw the lids gently up and down, and delicately to squeeze out the matter which has gathered during sleep, and then to wipe it off the skin with a soft sponge; but to wash it all out with a syringe, or brush it off with a hair pencil, is what I would forbid. After the period of active inflammation has passed, and that the profuse purulent discharge constitutes the principal, if not the only cause of annoyance, it must then be stopped; and this, I believe, may, in the great majority of cases, be effected by the solution of the nitrate of silver, ten grains to the ounce of water, or if this be ineffectual, fifteen or twenty may be employed without danger. Before dropping the solution into the eye, the purulent matter must, however, be removed. This I effect by gently pulling open the lids, and then squeezing them together, after which I drop some lukewarm water between them, out of a hair pencil, and squeeze them gently again, then I let the baby become quiet, and suddenly raising the lid drop in the solution. Next to the nitrate of silver solution I prefer that of alum; it has more astringent with less stimulating qualities than, perhaps, any other. Five grains to the ounce of water may be employed for common use, and the saturated solution once in the twenty-four hours.

I believe strong solutions of nitrate of silver are sometimes resorted to, and other active remedies adopted, with the view of preventing the enlargement of the palpebral glands, commonly called granular conjunctiva. I have even heard of the solid nitrate of silver being rubbed to the inside of the lids for this purpose, which I hope is not the case. As far as my experience has gone, the mucous glands of the conjunctiva lining the eye lids, do not become enlarged from inflammation at this time of life, and therefore the so-called granular conjunctiva is not to be feared from this disease. In fact, as I have said before, if the cornea escapes from the destruction which some call slough, and some call abscess, but which may, perhaps, be either or both, and the consequent ulceration, nature sooner or later effects the cure. I do not here enter on the treatment of the slough, abscess, or ulcer of the cornea, the prolapsed iris, the opacities or the staphyloma which take place in this disease, because I am sure that the safest course to be pursued by the accoucheur when any of these occur is to hand over the case to the management of a good surgeon, who understands the treatment of it. He will gain little credit should the case recover perfectly, and must bear all the blame should it be otherwise.

Believe me, yours very truly, A. JACOB.

Dublin, Oct. 1, 1841.

XIX.—RED GUM—(STROPHULUS INTERTINCTUS).

Almost every infant is affected three or four days after birth, with an eruption of papulæ, which has received the foregoing appellations. In its ordinary form this consists of a few red pimples, appearing in greatest number upon the face, neck, and hands, and interspersed with diffused red patches. When there is a slight degree of redness a distinction has been made, and the eruption termed *strophulus albidus;* and a rash of the same nature which occurs during dentition in larger quantity and with more irritation has been termed *strophulus confertus.* The ordinary *red gum* of infancy can scarcely be called a disease. It arises probably from the slight irritation attendant upon the new circumstances under which the skin and mucous membranes are placed, and requires no treatment. The nurse constantly looks for its appearance as a favorable occurrence; and we believe it merely indicates a healthy state of sensibility of the integuments and mucous membrane.

XX.—SWELLING OF THE BREASTS.

The breasts of infants, both male and female, contain at birth a secretion somewhat resembling milk, and which is generally supposed by the attendants to require speedy removal. Accordingly, they frequently set about pressing the part, until inflammation and occasionally an abscess is produced. This notion, however, is altogether erroneous. No measure for getting rid of the secretion is necessary; and we should forbid any attempt at adopting one. We have repeatedly had to open an abscess produced by pressure employed in the way alluded to, but which, nevertheless, was always attributed by the nurse to the want of sufficient removal of the fluid in question.

CHAPTER VIII.

DENTITION.

Absence of teeth has already been remarked as a character belonging to the mouth at birth. Infants, however, have been born with teeth;[*] while in a few instances none have ever grown. The first appearance of teeth usually begins about the sixth or seventh month. It may be much earlier, as the third or fourth month; but oftener is delayed to a later period: the age at which the teeth first begin to appear varying much, and often without any apparent relation to the constitutional powers of the child. The process is commonly completed during the first year, or year and a half; but may be protracted beyond the second year.

The number of the first set, or milk teeth, is 20;[†] and they make their appearance usually in pairs,—those of the lower jaw

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[*] When teeth are in the gums at birth, (usually the central incisors of the under jaw,) they occasionally cause distress by irritating the tongue during the act of sucking. In such cases, their edges, when sharp, may be filed down; or the teeth themselves extracted. But unless inconvenience arise, it is well to leave them undisturbed; for they are not always, as stated by Mr. Fox, merely the upper parts or crowns of teeth, without fangs.

[†]

4 Incisors in each jaw,	8
2 Canines,	4
4 Molars,	8
	20

In the second set there are—

4 Grinders additional in each jaw,	8
2 Dentes Sapientiæ do.	4
	32

Just previous to the temporary shedding of any of the teeth, there are no less than 48 teeth, at one time, in the two jaws: namely—

Deciduous teeth (all perfected),	20
Permanent do. (more or less perfect),	28
	48

coming out before the corresponding pairs of the upper; and a degree of uniformity is to be observed in the order and times of their appearing. The middle incisors are those that first come out; then come the lateral incisors, and after these the anterior molars; but not uniformly, (as some assert,) for the canine teeth occasionally precede. The posterior molars are the last to appear, at a period varying from the 20th to the 30th month.

Mr. Bell (in his Treatise upon the Teeth) expresses these facts, as to the appearance of the teeth, in the following tabular form:—

From 5 to 8	months	the four central incisores.
From 7 to 10	do.	the four lateral incisores.
From 12 to 16	do.	the four anterior molares.
From 14 to 20	do.	the four cuspidati.
From 18 to 36	do.	the four posterior molares.

In the fœtus the rudiments of the teeth are observable about the second or third month; and are found (as they advance in size) to consist of a double membranous sac. From the bottom of this arises a pulp, which is composed of nervous and vascular matter, and around which is found a colorless consistent fluid, which is gradually absorbed as the pulp increases in size. On the summit of this pulp (upon which the future tooth is moulded) ossification becomes visible about the end of the third month. The enamel is not formed until afterwards, which it most probably is by secretion from the vascular membrane lining the sac.* The groove or channel which had run uninterruptedly along the edge of the jaw-bone, now becomes divided by osseous septa, which grow across; and thus the alveoli are formed.

At birth ossification has already advanced in most of the first set of teeth; much of the crowns of the molars are formed, and those of the incisors are in general completed. Subsequent to the ossification of the crowns of the teeth, that of their roots takes place; and as ossification advances, the roots of the teeth continue to elongate, until first those of the incisors, and subsequently others, can no longer be contained within the alveoli, and the tooth is thus pushed upwards, the development of the alveoli themselves aiding in the process. The consequent absorption of the surface of the gum, and the apex of the enveloping sac, at length makes way for the appearance of the tooth, which is then said to be *cut*.

This process is a natural one, and does not necessarily lead to diseased action; but such is liable to occur in consequence

* According to recent researches, (by Mr. Nasmyth and others,) the tooth is formed by conversion of the vesicles or cells of the pulp, into the cells or fibres of the ivory, by the deposition of osseous matter.

of the irritability of the infant constitution, which is at this time particularly remarkable, as well as the proneness to sympathetic disturbance. Some irritation must attend the passage of the tooth through the gum; and this is caused both by the pressure of the crown of the tooth on the parts above, and of the root on the dental nerves below. Hence arises pain; and to this we are to attribute, as a chief cause, the morbid sympathies that accompany dentition. The degree to which these may amount, however, depends more upon the state of the infant at the time, than the extent of local irritation caused by the tooth; for we see what little suffering attends upon *cutting* the large double-teeth, compared with the small ones, which preceded them at a time when the susceptibility of the infant constitution was at its height.

Certain symptoms must naturally accompany dentition, however favorably it may proceed; and the attendant determination of blood to the parts contributes to these. Saliva flows in increased quantity from the mouth when a child is teething, and the gums are more or less swollen, hard, and hot. Thirst appears to be felt; for the child takes the breast more frequently, though for shorter periods than usual, dropping it, as if from the tender state of the gums; but the fingers, or whatever it can grasp, are often thrust into the mouth. The child is frequently fretful or peevish, and gets sudden fits of crying, or starts in its sleep, which is liable to be disturbed. The cheeks are occasionally flushed; and increased heat, or pulsation, may be felt about the head. A tendency often exists to disturbance of the stomach or bowels—the food being rejected; or slight diarrhœa attends. These symptoms, however, are not to be looked upon as constituting disease, but in general work their own cure, the local excitement being relieved by the inordinate flow of saliva, and the constitutional disturbance by the attendant diarrhœa; while some of them are obviously but indications of an increased activity in the process of ossification, as they often precede the appearance of the tooth by many weeks, but subside again in some days,—from eight or ten to fourteen. This may be looked upon as the first stage of dentition; and is called, in popular phraseology, "breeding the teeth." The symptoms again occur, but in a somewhat modified form, when the tooth begins to approach the surface of the gum.

The relation which subsists between dentition and disease, as arising directly therefrom, or merely complicated therewith, is most important; and upon a right understanding of this, will depend our success in the management of children while teething. On no subject does more misapprehension, in common, prevail. All complaints occurring about this time are attributed to dentition as their cause, and hence are frequently mismanaged, being altogether neglected as salutary efforts of nature, or attention paid only to the state of the gums; yet the just medium seems sufficiently obvious. Whenever a child is ill about the time at which the teeth may appear, we should carefully examine the gums, to ascertain how far the symptoms may be connected with their state; and act accordingly. But attention is not to be confined exclusively to the gums, nor are we to rest satisfied with remedial means directed thereto. The illness may be merely an accidental complication, or, even if connected with teething, may require active treatment on its own account. In a word, neglect of the state of the gums may render our other treatment unavailing, or attention to this alone, prove inadequate.

The morbid phenomena so often witnessed during dentition are influenced, first, by the degree of irritation caused directly by the teeth: secondly, by the degree of susceptibility of constitution existing at the time—the age and condition of the child affecting both.

The more suddenly the teeth are developed, and the greater the number coming out together, the more will be the local irritation, particularly should any obstacle be presented, as a disproportion between the rate of development of the teeth and the jaws, &c. &c. The earlier the age at which dentition commences, the severer is likely to be the constitutional disturbance, from the greater susceptibility of the system; for the natural susceptibility is heightened by the rapid evolution which the brain is undergoing at this early period, in addition to which, there is local determination of the blood, caused by the process going on; so that the nervous system is in the highest state of irritability: hence is symptomatic disturbance of all parts, but more particularly of the brain, so liable to be induced at the time of teething. The proneness to this will be increased by any thing that tends to deteriorate the general health, as the injurious effects of improper food, bad air, &c. &c. Delicate children suffer more constantly than the robust—their dentition being tedious; and in them, bowel complaints, with wasting, frequently attend. Any complaint, in short, to which a predisposition may have existed, is likely now to be developed; and any disease contracted at this time (as measles, pertussis, &c.) is attended with additional danger.

Dentition is, however, no longer regarded by the well-informed practitioner, as a universal source of infantile disease; and we shall treat only of such complaints as are to be traced distinctly to this source, resting satisfied with a general notice of its incidental relation to other maladies.

Many of the symptoms caused by dentition are truly nervous; but inflammatory affections do often arise from, or are complicated with it. The local symptoms of irritation in the gums are at times severe: and here, in truth, lies the origin of all the others. There may be much swelling, heat, redness, and pain in the gums, which will be so tender as not to tolerate the slightest pressure. This most usually occurs on the first irritation, during the "breeding of the teeth;" and the redness of the whole gum is then often very intense. At a later period, when the tooth is coming forward, the sensibility undergoes a modification, and pressure gives ease rather than uneasiness, the redness being now confined to the base of the gum, the surface being white, or looking like a vesicle stretched over the tooth. Aphthæ or ulceration may be present, and the cervical, or more usually the salivary glands, enlarged and tender, accompanied by a very profuse flow of saliva. The determination of blood may extend further, and engage the head, which will be hot and heavy; the cheeks red and swollen; and the eyes suffused and watery. Great thirst, heat of skin, restlessness and alternate heaviness, with disturbed sleep, or sudden startings therefrom, now attend; suppression of urine and confined bowels often go together, especially when the head is much engaged. This symptomatic fever is remarkable for its suddenness and variableness, often recurring and remitting within a few hours. Distant organs soon become implicated in a marked manner, and suffer sympathetically, either from inflammatory disease, or mere nervous disturbance.

Acute inflammatory affections, wholly independent of dentition, may occur during this process, which predisposes to them; but no doubt can exist that many such affections are directly connected therewith, as they rapidly subside when the irritation in the gums is mitigated, but are little relieved by any means, so long as this subsists undiminished. The treatment of such cases requires no modification beyond the necessity for paying primary attention to the state of the gums.

Nervous disturbance of various organs still more frequently arises in connection with dentition; and upon a correct diagnosis between these and the inflammatory affections, will depend much of our success in practice.

Some of these secondary affections appear to be rather of a salutary character, as if efforts of nature to afford relief by counter-irritation or derivation, as we see in the occasional free discharge of urine or abundant flow of saliva, and lax state of bowels, so constantly attendant upon teething. Suddenly suppressing these is certainly dangerous; and so long as they retain their merely sympathetic character, little should be done to interfere; but we are by no means to fall into the popular error, that treatment for such is never to be adopted, and so allow children to die of purging or vomiting, because they are getting their teeth. The mucous membrane is the tract most liable to suffer from these secondary affections, and the gastro-intestinal mucous membrane is that most frequently affected. The brain and nerves, however; the lungs, the skin, and the lymphatic glands, are all subject to this irritative disturbance; and we remark that occasionally the urine becomes pale and copious, as it is observed to do in the nervous affections of adults. It is at times, however, scanty and turbid, and passed with difficulty when fever is high, the head affected, and the bowels, in particular, much disordered; or a purulent discharge may take place from the urethra, and great pain attend the passage of the urine.

Symptomatic disturbance of the brain or nerves often induces sleeplessness, or very uneasy slumbers, with startings and sudden awakenings out of sleep, the child screaming and looking frightened. If there be grinding of the teeth, with tremor or rapid motions of the lips, convulsions are likely to follow, particularly if the fever be high, urine scanty, and bowels costive. These symptoms may depend on mere nervous excitement, or arise from congestion, or be connected with derangement of the digestive organs. Indeed in all severe affections of the bowels, the brain is certain, sooner or later, to participate; but the brain itself may be the seat of disorder without the condition of the bowels becoming necessarily disturbed. The convulsive movements are often confined to mere twitchings, or spasmodic motions of the face, eyes, and arms, and in such cases are not so dangerous as is commonly thought. In no case, however, are they to be neglected; for great danger attends when they become general, violent, and frequent. Death may take place suddenly, as if by apoplexy; or an incurable paralysis be the result, as we have more than once witnessed. In these as well as other instances of cerebral affections in the child, we should bear in mind that a state of exhaustion, as well as plethora, may give rise to the symptoms; and search out the cause accordingly.

An affection of the hands and feet has been described by Dr. Kellie, of Leith, as connected with dentition, in which a spastic contraction of the flexors of the thumbs and toes is a principal character; but a peculiar swelling of these parts, also mentioned by him, shows it to be an affection before described by Underwood. This swelling arises suddenly, is of a mottled or purplish hue, very round and elevated, and cooler than the surrounding skin. It may last some weeks, but usually terminates favorably in a few days, ceasing spontaneously when the tooth appears. Of the spasmodic affections connected with dentition, those of the respiratory organs are especially formidable, as spasm of the glottis, &c. &c. The most frequent of these, however, is the dry, nervous, irritative cough, that so often attends dentition, and which is sure to be aggravated by any derangement of the bowels. This, like all other symptoms dependent on irritation in the gums, will be mitigated, or at once removed, by the liberation of the tooth.

Diseases of the skin often occur during dentition, being popularly denominated "tooth rashes," but we should not look upon such as arising directly therefrom, unless they appear or disappear in relation to the condition of the tooth, which they do occasionally in a remarkable manner.

Affections of the lymphatic glands appear to arise rather in consequence of the debility induced by teething, than directly from the irritation caused thereby. Guersent, however, appears to look upon the early and rapid development of the teeth as occasionally the cause of tubercle and such affections; a view nearly the converse of that of Gardien, who considered very early dentition as caused by a scrofulous diathesis. To this view we ourselves subscribe; having observed that not only is the appearance of the teeth likely to be precocious in scrofulous infants, but that this process is mostly unfavorable in such; especially when the strumous diathesis is marked by external signs, as deficiency of ossification in the bones of the head, chronic hydrocephalus, &c. &c.,—so much is dentition influenced by the congenital condition of the constitution.

By far the most frequent of the symptomatic affections attendant upon teething are those of the stomach and bowels, which therefore we have reserved for the last. The bowels are often constipated, but purging or vomiting oftener attends dentition. The purging is characterized by being unaccompanied by pain on pressure; the tongue is moist and white, not red or dry; the appetite remains unimpaired, nor does the child lose flesh. Acidity, however, and flatulency, with griping, frequently attend, when the stools are green, and smell sour, as does also the breath. Vomiting is often conjoined with purging, during dentition, and may be, like it, merely symptomatic; but when they are carried to a great degree, this combination is a most formidable one, and often proves fatal. M. Cruveilhier has described a disease of this kind, as also M. Guersent (though with some difference); but we cannot agree with them in regarding it as necessarily connected with dentition, though often appearing at this period, as we have seen it prevail at times quite as an epidemic, and must regard it, with Dr. Joy,* as a species of cholera morbus.

Treatment.—The treatment of the morbid conditions connected with dentition is, in little, peculiar, beyond what concerns the local treatment of the teeth and gums, and in that most so, from the remarkable and prompt relief attendant upon lessening their tension. But we may remark in a general way, that looseness of the bowels or any flux occurring at this period, we should be slow to interfere with, as also with cutaneous eruptions; at least until we found such persisting, after irritation of the gums had ceased or been removed, and the child's strength beginning to give way. On the contrary, a slow state of bowels should be always attended to: and as important or more so, is it to obviate suppression of urine, as when this secretion is scanty and high colored, while the bowels are confined, febrile irritation is sure to be induced or aggravated, and severe cerebral symptoms are liable suddenly to appear; unless the bowels be well emptied; and especially the kidneys freely acted upon. Dr. Simon lays much stress on this point, and justly; for the beneficial effects of diuretics have not been sufficiently regarded in children's complaints. We have already noticed the good results of nitre given in such cases—the most marked mitigation of all febrile symptoms, (especially of those affecting the head or chest,) immediately following a free flow of urine.

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* See "Dentition," Cyclopedia of Practical Medicine—one of many excellent articles by Dr. Joy, to which we shall have occasion to refer.

When dentition proceeds favorably, as a natural process, little interference is required. Generally speaking, the child should be kept calm and cool, (more especially the head,) and much in the open air; the bowels rather free; and great care taken to avoid overloading the stomach, or giving stimulating food. And this precaution is as important to attend to with respect to the nurse as the infant. Exposure to cold air should be avoided, inflammatory affections being very liable to occur at this period. As dentition advances, or on its completion, the child usually suffers somewhat in its general strength, and will require improvement of diet, as the occasional use of a little weak chicken broth, &c. &c.; the object being to keep the system at a just medium. Dr. John Clarke especially recommends sponging the head daily with cold water. So long as no particular irritation or suffering exists in the gums, the less they are interfered with the better. Something, however, will always be done, and it is well to understand what that should be. One of the first symptoms of teething is tenderness of the gums, which are often so sensitive as not to tolerate any pressure; the child attempts to put things into its mouth, but appears to be hurt; and at this time, such should not be supplied. Gentle friction with the nurse's finger soothes the gums most: and if they are very hot, the finger may be previously dipped in cold water, or other fluid, that has been sweetened.

At a more advanced stage, as the tooth is coming forward, the mode of sensibility seems altered, and pressure on the gums gives satisfaction, so that the presence of hard substances is enjoyed. This is the period for corals, ivory rings, &c. &c. The latter, from their shape, are less liable to hurt than the former, and should therefore be preferred. Some particular virtues have long been ascribed to a ring of gold; but, even if not too expensive for common use, (it should be large to be safe,) the reasons assigned for its utility are unfounded: we cannot agree with Mason Good, that because ptyalism followed friction of the gums with powder of gold, in the experiments of Dr. Chrestien of Montpelier, such effects are to ensue from the use of the metal in form of a ring. The production of an increased flow of saliva is attempted, in some parts of Germany, by the use of little bags of spice and sugar; while in France they dip any substance used, in honey, or sweet decoction of barley, as being relaxant to the gums. Such practices succeed in occupying or soothing the child; but mischief arises from stimulating or overloading the stomach and bowels with sweets or spices. A good and simple plan is, to allow the child the use of a small wax candle, or occasionally a stick of liquorice root; but in truth, a crust of bread answers all useful purposes. When much local irritation prevails, and the gums become very hot, tender, and swollen, the tooth may be obviously on its way to protrude. The local treatment is now the most important point, often removing the necessity for any other; and without it, all other means may prove ineffectual. To relieve the tension, and remove the irritation, is our object, and the gums should be scarified; but there are two purposes for which this may be done, and according to which the operation will vary. We may wish merely to draw blood, which will be done by scarifying the gum freely, but not deeply: this may be advisable in the first stage of irritation, and before the tooth appears to be coming forwards. Such practice, however, is not often required; and we should never omit to explain our object, as a tooth is always expected to appear soon after the gums are scarified, and in this instance disappointment only would ensue. When our object is to open the gums so as to free the tooth, our incision must be made freely and firmly through the gum and capsule, until we feel the instrument grate upon the tooth. If it be a molar tooth, the incision should be crucial, or double, so as to enclose a small flap, which some advise to be cut out, but this is seldom required. The child's head should be held firmly by an assistant, while the operator stands before or behind, according as the tooth is in the under or upper jaw, and with the fore-fingers of his left hand keeps the tongue and cheeks out of the way, while he makes his incision longitudinally with a gum-fleam.* The instrument should be sharp and clean, and no fear need be entertained of ulceration. The bleeding that follows always does good, nor need apprehension be entertained about hemorrhage. The operation is scarcely attended with pain, and is followed by quick relief; but the tooth will not always immediately appear, even though the capsule be opened. A repetition of the operation is not unfrequently required; but when the local distress is relieved, the mere absence of the tooth is not a sufficient reason for its renewal. No one need suppose, that if a cicatrix be formed, it tends to retard the progress of the tooth, by its callosity,—the fact being, that newly cicatrised parts are those most easily absorbed. This operation should never be omitted when the local irritation runs high; and its prompt employment will always mitigate, and often remove any attendant symptoms, particularly if merely sympathetic, or of the nervous class; even when inflammatory, relief is afforded, and the usual treatment will seldom require to be pushed so far afterwards as in ordinary cases of inflammation.

II.—SECOND SET, OR PERMANENT TEETH.

The first set of teeth begin to fall or be shed at about seven years of age, and are replaced by the second or permanent set, the whole of which are, by this time, more or less ossified, with the exception of the dentes sapientiæ, whose ossification does not, in general, commence until about the ninth year. This process of changing the teeth occupies from five to six years in its completion; but is very variable both as to the time of its commencement and period of duration, much irregularity altogether prevailing as to the age at which the different permanent teeth are cut. They may begin to appear so early as five years old or not until eight, or eight and a half, and the termination of the process, or appearance of the third or last molares, (dentes sapientiæ,) may be delayed to the seventeenth or nineteenth year. With the second as with the first set, the teeth in the lower jaw generally precede those of the upper; and the first permanent molares frequently pierce the gum before the loss of the temporary central incisores—their appearance being in fact an indication of the approaching change; which commencing with the first of these molars, is completed by the appearance of the third or last.

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* It is often difficult to make a child open its mouth, and it may be well to mention the plan we have found most convenient: by pressing firmly with the finger and thumb upon each cheek, we never fail to separate the jaws; and in children who have already cut the front teeth, we can keep the mouth open, and prevent our fingers from being bitten, by turning a portion of the under lip into the mouth, between their teeth and our own thumb.

Dr. Blake recommends the incision to be made towards the external plate of the alveolar processes, so as to avoid injuring the connecting membranes and sacs of the permanent teeth. See Blake's Essay on the Teeth, p. 177.

The immediate cause of this change in the milk teeth seems to be (according to M. Serres) the obliteration of the artery of these teeth, and its canal, which takes place about the seventh year, more or less completely, when the fangs and sockets become absorbed. The ascent of the second set contributes somewhat to the general process, by destroying the nerves and vessels, but does not do so directly, as might be supposed; for the absorption of the root seldom if ever commences at its extrémity, but generally at some distance from it, often near the neck; while the permanent teeth have separate sockets of their own, and in consequence of the prolongation of the jaw-bones, which takes place at this age, do not lie immediately under the shedding teeth that correspond. Yet the presence, though not the pressure, of the new tooth is necessary, for in cases in which the temporary teeth remain, the corresponding permanent ones are found not to have been formed. In the fœtus, we see the germs of the greater number of the second set lying behind or below the first. It was necessary to supply the place of the first teeth, by a new set larger in size and more numerous, as teeth cannot alter in size or shape, and those which well befitted the mouth of the child, would ill fit the face of the adult, as may be seen from the spaces which appear between the first teeth, about the time the second begin to come; caused obviously by the natural enlargement of the jaw.

The increase in length and perfection in the articulation of the jaws makes a great difference between the adult and the infant in the powers of motion as well as in the form of the face. In the child the shape of the jaw-bones, anterior to the tubercle in the upper, and ascending plate in the lower jaw, is semicircular; and the articulation very imperfect, (before the teeth are produced,) the glenoid cavity little exceeding the condyle in size, and the articular eminence not yet being formed; the centre of motion being in fact in the condyle, and the movements restricted to simple depression and elevation, with hardly any approach to rotation—all in truth, that is necessary to the infant for the mastication of its simple food. In the growth of the jaw, the elongation takes place principally between the second bicuspides and the tubercle, in the upper jaw, and the same teeth and the ascending plate, in the lower; in the situation of the permanent molares or additional teeth, and posterior to the temporary ones.

The cutting of the second set of teeth is seldom attended with distress; and when local irritation does occur, it is little felt by the constitution, which has lost by this time its acute sensibility; but occasionally much local suffering and consequent constitutional distress does attend, and the free use of the gum lancet is required. When the teeth come up very irregularly, and press against those before them, or protrude by their side, so that some of the same teeth of both sets are apparent together, (as happens with the upper incisors,) extraction of one or more of the first set may become necessary: but it is only when one of the temporary teeth actually offers obstruction to the forthcoming of its successor that removal is necessary. If done merely to facilitate its approach, this object is frustrated, as contraction of the jaws follows extraction of a tooth, and so an obstruction is offered to the regular succession and nutrition of the permanent teeth. The anxiety so commonly felt at sight of the prominent position often occupied by the cuspid or eye teeth is usually misplaced as, in general, time alone is wanted to reduce them to their proper station. A year at least should be allowed, before the small double tooth near is removed (as it too often is) to make way for the eye tooth, which only requires the elongation of the jaw by natural growth to find place for itself.* This matter, however, belongs to the province of dental surgery,—as also the use of dentifrices, &c., which, however, children should be early taught to employ—at least, they should be instructed to brush their teeth night and morning, with a soft tooth-brush and water.

CHAPTER IX.

DISEASES OF THE DIGESTIVE ORGANS.

I.—GENERAL OBSERVATIONS.

The mucous membrane of the stomach and bowels is, in particular, subject to disease even in the youngest infant, being easily irritated and often inflamed; but an opposite state, or one of relaxation or mere debility, will be found not unfrequently to be present, whether as a sequel to these morbid conditions, or existing independently thereof. The mucous membrane may be affected through its whole tract; or what is more usual, in one part only, as the mouth or stomach; but frequently two or more portions are at the same time the seat of disease, inflammation of the stomach or bowels being much more frequently seen than that of the stomach alone; and of these parts some, as the small intestines, are much more liable to be attacked than others.

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* See Mr. E. Saunders' Advice on the care of the Teeth, p. 80.

Again, different structures may be separately engaged, as the serous or mucous membrane, or merely the mucous glands; and hence will vary the name of the disease according to its seat, or the nature of the affection.

Inflammatory affections are very common; and the inflammation may be simply erythematous, or may lead to ulceration, exudation, softening, or gangrene.

The ulceration may be of the ordinary kind, or what is more usual, of an aphthous character; and exudation may take place as a consequence of this ulceration, or independently of it; inflammation of mucous membranes having a peculiar tendency to the formation of such deposits in the child. Exudations upon the mucous membrane are of two distinct characters, either white and soft, being made up of the crusts of aphthous ulceration, or consisting of a peculiar secretion resembling milk or curd, and said to result from a particular form of inflammation; or the exudation may be firm and tenacious, truly consisting of an effusion of lymph. Any of these forms of disease may end in gangrene, or from the commencement show a disposition thereto; but this is more likely to occur in ulcerative than inflammatory affections, at least of the mouth and throat.

In the mouths of children, in particular, we may witness every one of these affections of the mucous membrane; and most of them may be seen in any tract of the intestinal canal. But some are much more liable to occur in certain regions than in others, as aphthous ulceration in the mouth, follicular ulceration in the ileum, and exudation in the pharynx or fauces; while a few are very rare in any.

The mucous membrane of the mouth in children shows a disposition to disease from the earliest age, and may be seen in a state of congestion at birth, or of inflammation almost immediately after. Ulceration, or exudation, are common consequences; and are always attended with a degree of danger, even in mild cases, from their liability to spread, and so pass into the digestive tube, or encroach on the air passages. So long as the disease is confined to the mouth, even in severe cases, little constitutional disturbance is perceived if the infant be young. But these affections are seldom merely local, being usually complicated with gastric or intestinal disease, symptomatic thereof. Hence, constitutional treatment, particularly as regards the state of the bowels, is never to be neglected; but attention must not be confined to this alone. Not less important is the local treatment; a prime source of danger, in such affections being (as already noticed) their tendency to *spread*.

An additional reason for at once trying to arrest their progress by topical application, is the liability to the occurrence of gangrene in unhealthy children or those living in unwholesome situations; while, at times, gangrene appears as a primary, if not epidemic affection.

II.—AFFECTIONS OF THE MOUTH, PHARYNX, ETC.

Inflammation of the mucous membrane of the mouth—Stomatitis—is not an uncommon disease among children; and may be brought on by cold, stimulating or improper food, the too frequent use of the sucking bottle, &c. &c., or may be symptomatic of a similar condition of the stomach, or other part of the intestinal canal.

The symptoms are heat, and redness of the lining membrane of the mouth, to a greater or less extent. The tongue and mouth are often dry; the lips may be swelled and excoriated, or surrounded by an eruption; and when the disease is protracted, and the infant but a few months old, a profuse flow of saliva occasionally attends. But there is seldom any appreciable fever, unless the infant has reached the fifth or sixth month, when such is usually present.

Inflammation of the mouth, when slight and uncomplicated, is unattended with danger, and usually yields to mild emollient applications, such as mucilage of gum, decoction of barley, or better, the linctus recommended by Boerhaave, consisting of equal parts of mucilage of gum, white of egg, and simple syrup; attention being at the same time paid to the state of the bowels, and care taken to remove any source of irritation, as in the nature of the food, the mode of feeding, &c. &c.

When complicated with intestinal disease, or symptomatic thereof, the case becomes serious, and the principal attention must be paid to the more dangerous disorder. When a tendency to run into ulceration, or sloughing, and to spread, is manifested, local applications, calculated to alter the morbid action, or arrest its progress, must be adopted; as recommended in the following section.

Inflammation of the mouth with ulceration—Ulcerous Stomatitis.—Inflammation, if intense or protracted, soon leads to ulceration, especially in children who are mismanaged, or placed in unfavorable situations, and whose general health is in consequence deteriorated. These ulcerations may be of a common character, or, what is more usual, of that peculiar form denominated aphthous, and long known under the general appellation of *thrush.*

Symptoms.—The common ulcer is usually large and irregular in shape; it is covered with a white yellowish slough, and surrounded by much redness. The ulcers are seldom numerous—often single, and are situated on the inside of the cheek, the roof of the mouth, or may be found on the tongue. We have occasionally seen in infants at the breast, an ulceration of the gums of a very acute character; but which seldom occurs after the first year. The gum appears spongy, vascular, or of a purplish hue; and the ulceration often runs deep, being disposed to bleed, and assuming a greenish or ash color; but it is not liable to slough. It occurs usually about the period of first dentition. Much local irritation attends these ulcerations of the mouth, with fever, which occasionally runs high, and is accompanied by great restlessness; the digestive organs being in particular deranged.

Treatment.—In mild cases, it will be sufficient to touch the ulcerated surface occasionally with a linctus composed of borax or alum, from gr. v. to gr. x., dissolved in an ounce of honey of roses; care being at the same time taken to regulate the state of the bowels, supply light but nutritious food, and expose the child freely to the fresh air. In severer cases it may be necessary to have recourse to one or two applications of the nitrate of silver, lightly touching the ulcerated surface therewith; but the local remedy from which we have uniformly derived most benefit in this and other forms of ulceration of the mouth, even when the surrounding inflammation runs high, is the sulphate of copper. A linctus, consisting of ten grains of this salt recently dissolved in an ounce of honey should be applied two or three times a day, by means of a camel-hair pencil. When the child is very irritable or restless, an anodyne will become necessary; and tonics, particularly quinine, must be had recourse to in protracted cases; or stimulants, as ammonia, when the strength begins to fail. The state of the bowels will of course be attended to; and the occasional exhibition of an emetic, when the breath is foul and efforts made to vomit, will be found useful.

Aphthous ulceration—Vesicular Stomatitis.—The form of ulceration most commonly seen in the mouths of children is the small circular white ulcer, called aphtha, and which occurs with them in a truly idiopathic form, (especially at the period of teething, being seldom seen before that time,) and is not necessarily connected with any constitutional or other cause, as is always the case when they appear in adults.

Most generally, however, aphthæ arise in connection with derangement of the digestive organs; and are hence oftenest seen in children artificially fed, and whose food not being properly digested, becomes a source of irritation to the stomach and bowels. We also see aphthæ appearing in the mouths of children sympathetically with disorder of some part of the intestinal canal, which is itself similarly affected. Thus, in the advanced stages of gastro-intestinal disease, aphthæ may spread from the stomach to the mouth, or co-exist at the same time, in two distant parts, being visible at the verge of the anus as well as inside the lips; but this does not necessarily imply that the whole intestinal tract is occupied by the disease.

When situated far back in the mouth, or on the pharynx, aphthæ are liable to spread downwards, either into the œsophagus or air passages; the former is most likely to occur; but it is only in children much broken in health, or placed in crowded and unwholesome situations, that such in general takes place.

Under these circumstances many children may be found affected with the disease at the same time—aphthæ appearing to spread epidemically: they are also capable of being communicated by direct contact to a similar structure, as true aphthæ have been taken by kissing the lips of an infant affected with the disease; but the nipple of the nurse does not seem to be affected with this form of ulceration, though often made sore or excoriated, from suckling an infant affected with the disease.

Symptoms.—An inflammatory condition of the mucous membrane of the mouth is not necessary to the appearance of aphthæ; neither is the aphthous ulcer always surrounded by a red or inflammatory border. The mouth, however, is usually hot, and the child fretful and uneasy. The appearance of the ulcer is that of a small white spot or speck, occurring singly or in clusters, on some part of the mucous membrane of the mouth or throat. When single or few, aphthæ are usually found on the inside of the lower lip, on the gums or on the tongue. When numerous or confluent, the inside of the cheek is often quite covered with them, or they extend backwards to the fauces. In these cases the aphthæ become covered with a continuous crust or coating of a whitish hue; but on this being removed, or becoming detached, the ulcerated points are visible beneath; and the secretion by which they had been covered, is quickly renewed. The whole process takes three or four days for its completion, from the bursting of the vesicle to the formation of the crust and the cicatrization; but a succession of single aphthæ may continue for several days, and even weeks. When two or more run together, or become *confluent*, they are much more slow to cicatrize; and altogether an attack of aphthæ usually runs a course of eight or ten days. The crusts, on being swallowed, become a source of irritation to the stomach and bowels; and it is thought that the disease itself may be thus propagated to these parts.

The bowels are usually deranged when aphthæ are present, being costive, and the secretions vitiated; or frequently diarrhœa attends, and acidity of the stomach is present: but there is not in general much accompanying fever, especially if the child be very young. Difficulty of mastication or deglutition may attend—the child being unable to suck, and so becoming restless and peevish from hunger; but we should especially note any alteration in the tone of the voice, peculiarity of breathing, or the occurrence of cough. When aphthæ present a yellowish or dark-colored appearance, we should be careful to examine whether this be caused merely by their being tinged with bile or blood, or is an indication of their assuming an unhealthy or gangrenous character. Such may be apprehended when we see in very delicate children or protracted cases, crusts of this description succeeding to the white appearance at first presented.

When aphthæ do become gangrenous, the surface grows brown, being covered with a hard eschar, or one soft and pultaceous; but when detached, the part beneath appears very red or granulated. The edges of the ulcer assume a torn, soft, or burned appearance, and the surrounding parts are soft and easily depressed, being swollen, and of a violet hue. As the disease advances, the mouth hangs open, allowing the saliva to escape, and a fetid odor usually attends. This condition is most liable to occur where aphthæ are situated at the back of the fauces; and seems to constitute that form of the complaint, known of old by the name of the *black thrush*, but which is not often witnessed except among the wretched children of the poor.

Diagnosis and Prognosis.—Aphthæ are particularly characterized by their small size, circular shape, and white color, appearing like small white round dots or specks on the inside of the mouth, and leaving a slightly depressed or ulcerated spot on the removal of this white covering or crust. So long as they retain this appearance, not showing any disposition rapidly to spread, nor the child's strength in any remarkable manner giving way, no apprehension need be entertained respecting the presence of aphthæ, which are not attended with danger in themselves, even though numerous or of long standing, though they may prove troublesome from liability to repeated attacks; but when they show a disposition to alter their appearance, assuming any of the characters already pointed out as indicative of their taking on an unhealthy action, or when they proceed to spread along the pharynx, much danger is to be apprehended. In the first case we have not merely to dread the occurrence of gangrene, but must look upon the alteration in the appearance of the ulcers, especially when occurring in the advanced stage of intestinal disease, and accompanied by prostration of strength, as indicating a state of constitution in which recovery is very uncertain. When aphthæ occur sympathetically, or during intestinal disease, they appear more on the fauces than in the idiopathic variety, and are in general an unfavorable symptom, but not necessarily a dangerous one, so long as they retain their healthy aspect, and the child's strength holds up. The extension of aphthæ down the œsophagus, though a serious symptom, is of little moment, compared with the danger that attends the extension of the disease to the air passages. When the child's voice becomes hoarse or indistinct, the breathing stridulous or spasmodic, with fits of suffocation and cough, immediate danger threatens, if indeed the case be not hopeless; for those who have not witnessed it, could scarcely credit the small amount of ulceration that seems capable of destroying life, if once aphthæ pass, or even reach the rima glottidis.

Pathology.—Aphthæ in general are seen to originate in an eruption of small, white vesicles, filled with a gelatinous or puriform fluid, but unless watched from the first, the vesicles may be overlooked. Ulceration succeeds, or a crust is formed of a white, pultaceous matter, consisting in the first instance of the collapsed cuticle left after the bursting of the vesicle, and then of a thin layer of lymph or concrete pus, or even of a slight slough, which leaves, on being removed, an ulcerated spot beneath. M. Billard, however, represents aphthæ as truly an ulceration of the muciparous glands, or follicles, which becoming inflamed, soften in the centre, and ulcerate. But as Dr. Benson justly observes in his valuable lectures, (see *Medical Press*, vol. v.,) "the superficial character of an aphthous ulcer is very different from the deep set ulcer of a mucous gland."

Treatment.—When aphthæ are merely a local affection, they may be often quickly removed by local means alone; but in most instances attention must be paid to the general state of health, particularly the condition of the bowels; and a mild laxative will in some cases remove the disease. When the bowels are merely costive, a dose of castor oil will be sufficient for this purpose, but if acidity of the stomach, or derangement of the secretions, be in addition present, we must have recourse to the pulv. rhei et magnesiæ, or the pulv. rhei comp. as advised at pp. 161, 162. We should be careful, however, to avoid irritating the bowels or stomach by the use of purgatives or emetics, although an emetic may occasionally be serviceable at the commencement of the disease; but when of long standing there is a risk of adding to the irritation already going on in the mucous membrane. When diarrhœa occurs, or the aphthæ appear during its presence, the chief attention must be paid to allay the irritable state of the bowels, and to support the strength when this begins to fail; particularly when the aphthæ assume an unhealthy aspect. Small doses of the hydrargyrum cum cretâ, with Dover's powder, may in the first instance be employed, and then the compound powder of chalk, with or without opium, according to the urgency of the symptoms. Regulation of diet or changing the nurse, attention to cleanliness, the occasional use of the warm bath, change of air, or at least free exposure to the fresh air, are essential in protracted cases, or when aphthæ are prone to occur; in which cases, light bitters with an alkali are best. When the ulcers present an unhealthy aspect, we must early have recourse to the quinine mixture, and in the more advanced stages, the free use of ammonia or the chlorate of potash will be found specially serviceable.

The local applications to be used in the treatment of aphthæ differ little from those recommended for the treatment of simple ulcerations of the mouth. The solution of borax in the first instance, and that of alum subsequently, will be found most serviceable—when the aphthæ are few or very irritable, touching them lightly with nitrate of silver, will most dispose them to heal, and lessen their sensibility. In the more protracted cases we have derived signal benefit from the linctus of sulphate of copper. Sulphate of zinc in syrup of poppy, as recommended by Dr. Symonds, is also an excellent application. A solution of chloride of soda answers well to correct the fetor when the ulcers show an unhealthy aspect; but should sloughing actually occur, we have recourse to the more decided measures required for gangrenous ulceration.

Inflammation with exudation—soft—white—muguet or millet.—We occasionally see in young infants an inflammation of the mouth more or less extensive, but not appearing to be of an intense kind, which is attended by an exudation of a soft white cream-like or curdy substance, being disposed in specks or patches, or even covering the whole surface, (particularly on the palate or base of the tongue,) so as to give the appearance of the child's mouth being lined with cream or curd; on removing this substance, the membrane beneath is found red and shining, but unbroken, the secretion being external to the epithelium, and not the result of ulceration as in aphthæ. M. Billard considers that in this instance the papillæ of the mucous membrane in particular are the seat of this peculiar form of inflammation, which chiefly occurs in young infants antecedent to the time of teething, and may be even seen in those but a few days old. Our experience is, decidedly, opposed to his, however, when he says that aphthous ulceration is never seen in infants until the period of dentition. Aphthæ may appear at the same time with muguet; but we cannot agree with Willan in regarding the latter as merely a vesicular disease. Neither do we coincide with Billard in considering the exudation in muguet as merely concrete mucus, but rather as some peculiar deposition, intermediate in consistence between the soft crusts of aphthæ and the true tenacious lymph in diphtherite.

This morbid secretion, to which the French have applied the term muguet, and to which perhaps belongs the English appellation *white thrush*, is seldom seen in this country, but appears, at all times, to prevail in the French hospitals where infants are crowded together and fed principally by hand. It is not, however, looked upon there as being contagious, even by direct contact, children being said to drink, with impunity, from the same cup with those affected by the disease. We have occasionally seen it in infants who were very delicate or ill fed; and in one or two instances to such an extent that the white fluid exuded from the nostrils. The mucous membrane near the anus also may present a similar deposit; or it may appear in the stools—for muguet, like aphthæ, occasionally occurs in the tract of the intestinal canal, but much more rarely.

Like aphthæ, it may extend down the œsophagus or into the air passages; but it is not a disease attended with much danger; neither have we any directions to give as to its treatment differing from those already advised for the management of aphthæ; except, perhaps, that alum in particular, seemed to us to exercise an effectual control in checking the tendency to the renewal of the secretion. The best mode of applying this, is by means of a moist sponge rolled in finely powdered alum and pressed against the affected part.* All astringents act most powerfully in the solid form, but we hesitate to employ with the child the method recommended by Velpeau, of blowing the powder of alum through a quill, into the back of the mouth.

Inflammation with exudation of firm, tenacious lymph—Angina membrancea—Diphtherite.—An inflammatory affection, intense in degree, and peculiar in kind, being attended by a peculiar exudation, may be seen affecting the pharynx, soft palate, or tonsils in children. This disease is not confined to children, but is seen more frequently in them than in adults, particularly in very young children that are unwholesomely fed and placed in low, damp situations. Under such circumstances, the disease occasionally occurs in the form of an epidemic, and appears to be highly contagious; but is not a disorder commonly met with. It is very necessary to distinguish true diphtherite from other affections of the same parts with which it is confounded, as our chief chance of success depends on an early discrimination of the nature of the case, so as at once to apply remedies to arrest its progress. True diphtherite (as its etymology implies) is "a pellicular inflammation,"* or one attended with a membranous exudation; but unaccompanied by any breach of surface or ulceration. It is, however, liable to be attended with gangrene or sloughing, and this constitutes a variety of the complaint differing from the more acute or highly inflammatory kind, in which this termination need not be apprehended, and hence this source of danger is removed; but in both forms, the tendency of the false membrane to spread and enter the air passages, constitutes a special source of danger in this complaint.

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* We may here remark, that whatever applications be used in those affections of the mouth, orders should be given to have them laid on gently with a feather or camel-hair pencil, not rubbed in with a piece of linen, as attendants will be sure to do, if not warned against their rude propensity for *scrubbing* the child's mouth, by way of making it clean—a certain method for aggravating the disease or even causing ulcers to slough. [Note to Fourth Edition.]

Symptoms.—These will vary according to the form of the complaint, and this seems to depend much on the class of persons attacked; the affection of the throat assuming more or less of the acute inflammatory character in children that are well fed and robust, while it quickly presents the gangrenous aspect in the feeble, ill-conditioned children of the poor.

In the acute form, we find the mucous membrane of the fauces presenting at first a bright red color; then quickly becoming studded with specks or patches of false membrane, seen on the posterior pharynx, the tonsils, or the velum. When the inflammation is severe this assumes the appearance of a continuous layer of thin, white and smooth, concrete substance; or in still severer cases, the lymph is deposited in masses of a grey or yellowish color, presenting an irregular surface and of a soft consistency, so as easily to be detached though again soon renewed. The palate and tonsils in addition to being highly inflamed, are considerably swelled, yet deglutition gives little uneasiness, and the throat is but slightly painful. In very mild cases, the disease nearly resembles muguet, the lymph being so soft or pulpy that it can be marked by the finger like concrete mucus, and this variety is hence called *pultacea* or caseiform. The constitutional disturbance is not in general great; the skin is warm, but the pulse though full is not quick. Far different are the symptoms both local and general, in the other form of the disease, when it assumes the malignant type and is presented to us as an epidemic of a fearful and fatal nature.

The invasion of this form of the disease is often slight or hardly perceptible, the throat giving no uneasiness at first, nor presenting, when examined, any very marked redness—soon, however, difficulty is experienced in deglutition, and often liquids are returned through the nostrils, before there is swelling of the throat to any degree sufficient to account for this occurrence. The submaxillary glands, however, often become swollen and painful. The lymph thrown out on the inflamed surface in this form of the complaint is soon presented in the shape of a dense and extensive membrane, of a yellowish grey, or dirty ash color, and, when tinged with blood, appears from its dark hue, and the dreadful fetor that often accompanies the disease, to constitute an extensive gangrenous slough. On accurate examination, however, this appearance is found to be altogether deceptive, no sloughing or even softening of the mucous membrane taking place, as is plain on detaching the false membrane, which leaves the surface beneath without any of the peculiar odor of gangrene: the fetor, however intolerable, arising solely from the detached membrane, which seems to undergo a putrefactive process. This distinction is so absolutely insisted upon by French writers, that we might presume such must be always the case; but undoubtedly the mucous membrane itself does occasionally slough, being found of a deep ash, or even black color, beneath the detached lymph, and coming away therewith, until the throat presents a hideous chasm. Blood frequently exudes from the lips and gums, or an acrimonious discharge from the nostrils; and the membrane may be so extensively deposited as to reach to the nasal fossæ themselves; portions being occasionally discharged with the acrimonious secretion therefrom. It is the extension of the membrane into the air passages, however, that in a particular manner constitutes the danger of this form of diphtherite, and this is certain to occur, if the progress of the disease be not arrested, or the patient does not first fall a victim to the malignant fever that attends the complaint.

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* For a full account of this disease see Bretonneau's work:—Des inflammations spéciales du tissu muqueux, et en particulier de la diphtherite, ou inflammation pelliculaire, connu sous le nom de croup, &c. &c.

From the very commencement of the attack, a great prostration of strength and disorder of the nervous system usually attend. The skin is cool or moderately warm; and the pulse, though not rapid, is feeble. The general powers soon begin to give way in many of the severer cases, and in some the powers of life rapidly sink; the breathing becomes hurried, delirium is succeeded by stupor; the pulse grows very soft and feeble; the patient dying, often unexpectedly, in a day or two; or at times even within twenty-four hours after the first invasion of the malady. So rapid a catastrophe, however, is not the ordinary course of the disease even in fatal cases. The strength may hold up, and death be protracted to the tenth or sixteenth day, with deceitful intermissions, especially in children, who may be playing about shortly before death; which in such instances, will be found to be hastened by some sudden extension of disease to the trachea. It may not be until the fifth or sixth day that the disease begins to assume a serious aspect, the breath becoming foul and the lymph thick and dark colored, while the pulse grows soft and compressible. The bowels now also begin to be in a particular manner affected, there being griping, with thin, watery, brownish stools, though without bile; and occasionally nausea, vomiting, and tenderness of the epigastrium—which are sure to take place when there is any extension of the disease to the stomach. The symptoms increase in severity, and about the tenth day signs of sloughing manifest themselves, and our worst fears are too generally realized.

When the fatal result is more directly connected with the extension of the false membrane into the air-passages, we find symptoms of suffocation present. There is indistinctness or hoarseness of the voice, and a cough, frequent, harsh, and of a croupy sound; the breathing becomes laborious and often convulsive, while the nostrils dilate, and the veins of the neck swell. As the case proceeds, the efforts to carry on respiration grow more feeble and languid; the face assumes a pallid hue, the eyes are sunk, the chest heaves, and as the powers of life subside, the child dies comatose or convulsed.

When the membrane extends down the bronchial tubes, (as it occasionally does,) the expectoration is limpid and mucous; the respiration gives a mucous sound; the dyspnœa increases; and occasionally shreds of the false membrane are spit up; or even portions moulded, as it were, in the air tubes, and bearing their shape.

The form in which the disease presents itself appears to depend much on the class of persons attacked, or the situation in which it arises; the malignant form being that usually seen when the disease occurs in low, damp situations, and in the crowded habitations of the poor, among whose children it often spreads with frightful rapidity, attacking in particular those that are very young and weakly. The most robust children and best situated, however, are not safe from even this form of the disease, when spreading, as it does at such times, (generally during the spring months,) with the rapidity of an epidemic, rather than merely as a contagious disease; but in general, strong and healthy children suffer only from the acute form of the complaint, which, if not severe in degree, is unattended with any particular danger, as the false membrane remains confined to the pharynx, without a disposition to spread farther down.

Diagnosis and Prognosis.—The affections with which diphtherite is most likely to be confounded, are aphthous ulceration existing in the pharynx, the gangrenous sore throat, and muguet. It is not uncommon to find aphthous ulceration in the situation described, denominated diphtherite; for with some, every spreading ulceration at the back of the throat goes by this name; yet, the distinction is at once obvious and easy, the ulcerated state of the mucous membrane, on removing the aphthous incrustation, distinguish it from the merely inflamed condition of the same surface in diphtherite. Equally decisive is the distinction between gangrene of the throat, in which the mucous membrane is found in a state of slough or sphacelus, and that malignant form of diphtherite, in which this membrane, although it may be dark red or even livid in color, is still found in a state of integrity on the removal of the putrid membrane. Even should the mucous membrane slough in diphtherite, the presence of the peculiar lymphy coating distinguishes it from simple gangrenous sore throat, in which, although spots of lymph may be deposited, no concretion takes place, and to which children are little liable. The distinction between muguet and diphtherite is sometimes not so easily to be made; but the deposit in muguet commences in the mouth, and is not so continuous nor tenacious; while the age of the child, and the history and progress of the case, soon help us to a diagnosis.

Our prognosis in this disease must be always guarded, and we must take care not to be misled by the absence of any uneasiness in the throat in the first instance, but when diphtherite prevails, be particular in examining the fauces, the moment a child sickens or appears ill; for in some instances the disease will be found decidedly established before any complaint has been made of the throat, and the worst form of the disease may commence in this insidious manner. The malady is more dangerous when spreading as an epidemic than when occurring in isolated cases; and also more fatal in very young children than in those more advanced. When the child is healthy, however, and the disease of the acute kind, but not severe in degree, there is no particular cause for alarm, for the thin white and smooth exudation does not in general show a disposition to spread beyond the pharynx, and such may be seen not uncommonly as an accompaniment of scarlatina or measles. Even in the still severer form, where the lymph is thrown out in masses, as already described, there is not a tendency to spread to the larynx, though the deposition at times appears on the œsophagus. In very acute cases though of the most healthy form, however, the false membrane will spread into the larynx, if not early arrested; and in some instances its formation seems to occur almost simultaneously in the air passages and on the pharynx, the croupy symptoms appearing to co-exist with the appearance of the lymph on the fauces: such a case we need hardly say must be almost necessarily fatal. In favorable instances, on the contrary, the lymph is occasionally absorbed even without being shed, growing gradually thinner, so that the red papillæ begin to appear through it like a veil; or the lymph, when detached in patches, (as it usually is after a few days,) is renewed in a much lighter form; and in a few favored cases, does not again reappear. In the malignant form of diphtherite we have a double source of danger, a fever of the typhoid type being added to the almost certain affection of the trachea, for unless arrested in its progress, the false membrane uniformly descends into the air passages in this form of the complaint, which constitutes one of the most fatal and fearful diseases to which the child is subject. We are happily, however, not left without resources even in this formidable disorder, and although our prognosis must always be unfavorable, the prompt application of remedial means exercises a decided control over the disease. Even after the air passages have become engaged, recovery seems in some cases to have been effected.

Pathology.—Having noticed so fully the nature of the deposition in this disease, and the condition of the mucous membrane connected therewith, it only remains to observe, that on the post mortem examination, the false membrane has been found extensively deposited, covering not only the parts visible to the eye during life, but extending in some instances along the œsophagus, even to the cardiac orifice of the stomach; and almost uniformly occupying the trachea, to a greater or less extent; the bronchial tubes even not being free from its presence. The membrane is a deposit of true lymph, though varying in appearance and consistency, according to the nature of the case. Hence, this disease has been looked upon as identical with croup by Bretonneau; and Guersent seconds him in this opinion, which is, however, obviously to confound two distinct diseases, and fall into a grave error in practice.

Treatment.—Passing over in the first instance, any notice of remedies commonly employed in inflammatory affections of the acute or malignant kind, we at once inquire are there any topical applications that, locally applied, are capable of altering the morbid action going on, and so arresting the progress of the disease, or destroying the false membrane when formed; or do we know of any constitutional remedy that would give hope of success even after the disease had extended beyond the pharynx. To both queries we are able to answer in the affirmative; but more reliance is to be placed on the topical than general remedy; and early recourse to either is essential to success. On the very first appearance of the affection of the throat,* a strong solution of nitrate of silver (at least, gr. xx. to ℥i.) should be extensively applied by means of a camel-hair pencil, to the sound parts as well as those already affected, and repeated, to prevent renewal of the membrane, which, though it may be removed in the first instance, is still liable to recur. By this means the spread of the inflammation has been arrested, and the deposition of lymph checked, when the case was not of the worst form, and has been taken at the outset. We have seen a similar result attend the use of a saturated solution of sulphate of copper. In the more formidable form of the disease, or at a more advanced stage, however, a much more energetic application must be employed: and all agree in giving a preference to the application of the muriatic acid, undiluted, or mixed with one or two parts of honey. It is to be applied by means of a piece of sponge attached to the end of a probang, and pressed firmly against the inflamed part. By this means the membrane, even after it has become putrid, has been destroyed and detached, the acid occasionally requiring, however, to be applied a second or even third time; this application exercising its influence specially in destroying the membrane, as the other does in preventing its formation.

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* It is a good and safe rule in practice to wash over the back of the throat with a strong solution of nitrate of silver, the moment the mucous membrane appears affected, when a child sickens during the prevalence of scarlatina, diphtherite, &c. &c. &c. The case is thus not only made manageable, but the evil often altogether averted. [Note to 5th Edition.]

The administration of mercury so as to affect the system, is the constitutional mode of treatment which has been looked to for arresting the disease, even after the membrane has spread. In very young children this result, however, can hardly be expected, but in the more grown the testimony in favor of this plan of treatment is so strong, that it should certainly not be left untried. When mercury has affected the system, we may look with confidence to an arrest of the progress of the disease towards the trachea, if not even to the staying of its course there, but the tendency to sloughing is not likely to be mitigated thereby, if not, indeed, the reverse; and we must be careful to watch the influence of the mercury on the gums, as the fetor of the disease is likely to disguise the odor of the mineral, and so, excessive, if not dangerous salivation be induced.

As to common antiphlogistic measures, local or general, little reliance is to be placed upon them, even in the acute or inflammatory form, though a few leeches to the throat may be occasionally of service: blood-letting is not to be relied on, and often proves injurious; and such measures are quite inadmissible in the other form of the complaint. An emetic, in the commencement, may be of use; and purgatives, according to circumstances; but we must early look to supporting the strength by nourishing diet; and the administration of tonics and stimulants, as quinine and ammonia. The chlorate of potash and chloride of soda, are especially deserving of trial. Particular attention should be paid to ventilation. Changing the child to an airy and healthful situation is always serviceable,

if not essential to recovery; and we must insist on the necessity for at once removing healthy children from any place in which the disease has appeared.

Gangrene—Gangrena Oris.—A particular form of gangrene of the mouth, without preceding inflammation or ulceration, occasionally attacks infants, especially such as are very feeble at birth, or broken down by disease; but this disorder may occur in older children, from two to six years of age, when debilitated by ill health, or of a feeble, strumous habit of body; particularly such as have suffered from worms, or live in low, damp situations in towns—the disease often appearing, indeed, to appertain exclusively to one locality.

An œdematous circumscribed swelling appears on the cheek, with a central point more or less hard, over which occurs a dark red spot. This spot may appear on the inside or outside of the cheek; and the skin over the œdematous part is characterized by an oily appearance; while the whole cheek presents a deadly pale hue, and the œdema generally extends to the eyelids of that side, so as to close them. An eschar forms from within outwards on the central point; and the soft parts mortify, often extensively, down to the bone, so that the parietes of the cheeks and gums are destroyed,—falling off in shreds, mixed with a dark sanguineous fluid, and accompanied by a very fetid odor. The pallid hue of the affected cheek is, in this disease, very characteristic; but such an appearance is more or less to be observed in most cases of inflammation or ulceration of the mouth in children, as a natural consequence of the increased action going on within, and is the more remarkable when contrasted with a heightened color in the opposite side—a circumstance judiciously pointed out, by Mr. W. C. Byrne, (see *Medical Press*, vol. iv. p. 182,) as an indication of morbid action, which should lead us to examine the mouth, although no complaint may have been made of that part, nor other indication of the disease given.

No disease can be more frightful or formidable than sloughing of the mouth in children. Recovery seems impossible, when once the disease has set severely in, the child sinking beneath the constitutional disturbance, independently of the local ravages of the disorder, which, however, are often such as to render recovery not to be desired, so frightful is the deformity necessarily entailed: yet occasionally recovery will take place, after the disease has committed much local ravage; and even the appetite and rest may continue unimpaired up to an advanced period of the complaint. The fever, which may have been at first high, then sinks into low typhus; the bowels become greatly deranged, and diarrhœa often attends at the close.* The early application of the muriatic acid, as already advised, (p. 223,) is the only efficient application in these forms of gangrene, unless we would try the butter (chloride) of antimony, as a powerful caustic, capable of destroying the unsound surface, without causing any inflammation in the surrounding parts. This, however, is by no means a merely local disorder; and attention to the state of the bowels, the administration of bark, wine, and the mineral acids, with a nutritious diet, the occasional use of an opiate, and above all, change to a new and healthy locality, afford us our principal chance of success in attempting to arrest the progress of the complaint, which is one, happily, of rare occurrence.

A malignant pustule, commencing on the inside of the cheek, and extending outwards to the skin, may succeed to small-pox, measles, or scarlatina; and take a course as severe or destructive as that of the disease just described, from which, in truth, it does not essentially differ. Huxham notices, in his Reports for July, 1745, mortification of the mouth and fauces as occurring after measles, the disease during which we have oftenest seen this affection, although by no means confined thereto; neither does it take place only in female children, as some have asserted. Dr. M. Hall (see Edinb. Med. and Surg. Journal, vol. xv.) states that all the cases he observed occurred after antecedent disorders of the digestive organs, typhus fever, or some inflammatory disease.

The malignant pustule of the cheek is obviously analogous to the pemphigus infantilis, or gangrenosus, if not identical therewith, as we have been accustomed to regard it; differing only as to the part of the body in which it occurs; for the two diseases (or rather two forms of the same disease) have been seen occurring at the same time and place among sick children. A striking example of this fact is given by Mr. Ryland, in his interesting Report on the Diseases of Children, in the seventh vol. of the Transact. of the Prov. Med. and Surg. Association; for at the time that these affections of the mouth prevailed among several children at the Birmingham Asylum, laboring under measles, other children were attacked, while suffering from the same complaint, with the affection of the pudenda, described by Mr. Kinder Wood, and recognized as a pemphigus in this work, (see Constitutional Diseases.) The affections of the mouth occurring, however, during these febrile complaints, or during recovery therefrom, are not necessarily of so severe a character, but oftener present the milder and more ordinary form of ulceration of the gums, known by the name of canker, and in which, although sloughing may occur, the ulcerative process predominates.

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* Mr. Dease the elder describes a disease of this description, under the name of "gangrenous erosion of the cheek;" and by Mr. Burns, a similar disorder is described as Noma. The subject has been largely treated of by Continental writers. See Isnard's "Dissertation sur une Affection Gangreneuse particulière aux Enfans;" and Barou's "Memoire sur une Affection de la Bouche."—*Bullet. de la Facultè*, 1816.

Cancrum Oris.—It is not uncommon to see ulceration of the mouth occurring in children, and at times ending in mortification, which has been described by authors under this appellation, and is noticed by Dr. Cuming, (formerly assistant physician to the Dublin Institution for the Diseases of Children,) in an excellent paper on this subject, printed in the fourth volume of the Dublin Hospital Reports. He confines this appellation to a form of ulceration, generally commencing in the gums, and thence extending to the lips and cheeks. It may be acute or chronic; and is more liable to be attended by sloughing, the more acute it is; but the ulcerative process still predominates, and by it, principally, is the destruction effected. This variety of the disease, according to Dr. Cuming, does not attack infants at the breast, nor under a year and half old; but is met with in children between twenty months and seven years of age; and occasionally assumes a very destructive character, running into a deep, foul, dark, and sloughing ulcer. We, not unfrequently, see ulcerations of the gums and mouth in children, particularly about the periods of first and second dentition, which present some of these characters, but are, generally speaking, neither severe in form, nor dangerous in degree. The gums are more or less spongy, and the ulcers deep and foul, but small in size. At the period of second dentition, in particular, such may be seen; the worst cases appearing to arise from the irritation caused by several teeth being shed at the same time; or rotten stumps being allowed to remain in the gums, without being extracted. When such is the cause, the removal of this source of irritation must be our first step towards effecting a cure.

The several remedies already recommended in ulcerations of the mouth are applicable in this disease; the nitric acid lotion or the muriatic acid being, in bad cases, our chief resource. Black wash has, in milder cases, proved very beneficial; or the tincture of iodine as recommended by Mr. John Davies.

The danger of ulceration of the mouth in children is enhanced, or a new danger created, when mercury is intemperately given during the progress of these febrile complaints, or indiscreetly exhibited during recovery therefrom; or, indeed, while the system in children labors under any disease of low vital manifestation. Sudden, severe, and destructive salivation is thus not unfrequently set up, by which the gums are quickly destroyed, so that the alveoli have been laid completely bare, and the ulceration extending to the cheek and taking on a phagedenic character, has produced all the most frightful ravages already described; with the additional suffering and danger of a state of mercurial erythism. This affection has been noticed by Dr. Stokes in his lectures; and some cases will be found recorded in the 1st vol. of the Lancet for the years 1838–39. We have seen the disease brought on oftener by the incautious administration of a dose of calomel given as a purgative to a feeble child, just recovering from scarlatina or measles, than as the result of mercurials administered during these diseases—but thus also may the attack be induced. It is a frightful and fatal affection, to be treated on principles similar to those already laid down, with the addition of such measures as are usually adopted to mitigate or counteract excessive salivation. It is more than this, however, being a form of destructive ulceration that seems to be peculiar to the child, and deserving of a distinct notice, under the name of cancrum oris *mercuriale.*

Cynanche Parotidæa—Mumps.—Children are liable to an inflammatory affection of the parotid gland, which often extends to the sub-maxillary, and is of a specific character, not tending to suppuration, but running a regular course of about four days' duration, when it usually ends by resolution. This disease, which is known by the familiar appellation of *the mumps*, is not exclusively confined to childhood, though most frequently seen at that period; at times, it spreads as an epidemic, particularly among the children of the poor; and it is decidedly contagious.

Symptoms.—A small external tumor, occupying the site of the parotid gland, appears generally at both sides of the neck together; but is occasionally to be seen at one side only. The tumor which was at first remarkable and circumscribed, soon becomes extensive and diffused, often involving the maxillary glands in the inflammation, and continuing to increase until the fourth day. The tumor is hard and somewhat painful; but little fever or constitutional disturbance in general attends, unless when the swelling becomes of considerable magnitude, as it occasionally does, so as to impede deglutition or respiration, and cause congestion of the brain. At times, but very rarely, the tumor will thus proceed to suppuration, and may cause immediate death, by discharging its contents into the larynx, if it bursts internally; or lead to great deformity, when it opens outside.

Most usually, however, the tumor begins to decline on the fourth day, altogether disappearing in a few days more, and with it any febrile symptoms that may have attended. The swelling, when going off, is liable to be transferred to other glands, the testicle in the male or mammary gland in the female, where it runs a course similar to that which it does in its first situation, or occasionally alternating between these glands, and those of the neck; and is at times so severe as to cause suppuration in the testis or mamma. In general, however, this transference of the disease is to be regarded rather as a favorable occurrence, the chief danger in mumps arising from the sudden suppression of the disease in the neck. When the swelling rapidly and prematurely disappears, the febrile symptoms all become aggravated; and in particular, the head appears to be engaged, or the respiration becomes laborious, and death may follow. The sudden disappearance of the morbid action from the testicle, after it has been established there, may also be followed by similar results.

Mumps are not otherwise attended by danger, running their course in general safely, though occasionally proving troublesome from a chronic enlargement of the gland remaining behind. Like other epidemics, a bad form of the complaint may at times prevail, especially among the children of the poor.

Treatment.—Little is required in general to be done in the treatment of such a mild complaint running a specific course. When the febrile symptoms seem to demand interference, an emetic in the first instance, and some mild aperients after, will be all that is required. In the severer cases a few leeches may be necessary to relieve the head, or reduce the swelling of the neck, and when the swelling is suddenly suppressed, stimulating liniments or a blister should be applied to the part where it had been.

III.—AFFECTIONS OF THE STOMACH AND BOWELS.

The stomach and bowels are peculiarly liable to be disordered in the child; and these disorders may arise from mere functional derangement, as in some forms of diarrhœa, cholera, &c., or from inflammatory action, leading to organic change of structure. The functional derangements are most commonly induced in consequence of the administration of improper food; or they may be purely symptomatic, arising from sympathy with some other organ, which is in a state of disease. However originating, these derangements of the digestive organs soon tend to the production of diseased action in the parts affected—irritation frequently giving rise to inflammation and its consequences. This, however, is not necessarily the case;

and mere functional derangement may be so severe, or protracted, as to destroy life, and yet no trace of organic change be found after death; at least no signs of inflammatory action. To distinguish such cases from those which are truly inflammatory, is often a difficult, but always an important task. We shall endeavor to draw the line of distinction, being careful to set down the symptoms which indicate inflammatory action, and those which may exist independently of it; while we candidly point out those cases respecting which doubts must unavoidably exist. It is only by attention to the whole group of symptoms, not to any particular one, that the true distinction is to be attained; and we must keep in mind that symptoms of inflammation are liable to arise during the progress of a complaint not necessarily or originally inflammatory, as occurs in infantile cholera, protracted diarrhœa, or remittent fever; while, on the contrary, a state of irritability dependent upon debility will, at times, follow true inflammation, as enteritis; but which would be only aggravated by a perseverance in antiphlogistic measures.

Inflammatory affections of the stomach and bowels are of frequent occurrence in the child; and may arise directly from impressions of cold, or the effects of damp, particularly when associated with a peculiar influence exercised by the season, as we see in the frequent bowel complaints of children observed during autumn; or inflammation may be the result of a severe or continued irritation of the mucous membrane, induced by improper food; or symptomatic of some existing disorder. The stomach alone may be inflamed; but much more frequently the inflammation extends farther, involving the mucous membrane of the small intestines to a greater or less extent, and constituting a case of gastro-enteritis. The lower portion of the ileum, in particular, is a frequent seat of inflammation; or the large intestines may be affected, and give rise to dysentery.

The inflammatory action, going on in the mucous membrane, soon tends to its disorganization; ramollissement is induced, or ulceration set up; but death may ensue before either of these states occur, the mucous membrane being found merely reddened, or injected. In ramollissement, the membrane becomes friable, easily peeling off in soft reddish masses, when the disorganization is caused by inflammation; but there is another form of this affection in which the softened membrane is white, and which does not owe its origin to inflammatory action. When ulceration ensues, it is found to have its seat in the muciparous glands or follicles, being analogous to the aphthous ulceration of the mouth, with which it is often combined. Excitement of the muciparous glands, however, may give rise to severe or serious symptoms, without their being actually inflamed or ulcerated.

An alteration of secretion, identical with that observed in the mouth, and called *muguet*, may occur in the intestinal canal, but is seldom seen. Gangrene has, in some instances, resulted from intense inflammation of the mucous membrane of the stomach; but more particularly of the ileum. The intestines have been thus perforated, and peritonitis induced on the escape of their contents; but this is more frequently caused by follicular ulceration. The peritonitis thus induced is the most dangerous with which we can have to contend. Such cases are, however, happily rare in the child, but peritonitis, independently of this cause, occurs in the infant as well as the adult.

When the mucous membrane of the lower portion of the canal is much irritated or inflamed, pain or straining attends the passage of the stools, or prolapsus ani is induced; and hæmorrhage of rather a severe character may attend, or be induced in consequence of congestion, or inflammation of the mucous membrane.

The fever attending inflammatory affections of the bowels is often severe, and the local symptoms well marked, particularly if the child be grown, and the attack recent; so that in many instances no doubt need be entertained as to the nature of the case. In others, however, where the infant is very young, the invasion of the disorder and its progress may be so insidious, as to tend to extensive organic alteration, before the true nature of the case is suspected. The fever attendant on disorders of the digestive organs in the child, usually assumes the remittent form; infantile remittent fever being now well understood to be connected with intestinal irritation, whether caused by extraneous matters, as worms, or undigested food; or by a morbid condition of the mucous membrane itself. We must recollect both these sources of disorder, and learn to distinguish them, if we wish to understand or treat this disease aright.

The sympathetic disturbances of the head, chest, or skin, caused by disease of the digestive organs, whether acute or chronic, in a particular manner demand attention, and shall be specially noticed.

We now proceed to consider separately the several disorders of the stomach and bowels, to which the child in particular is so subject—beginning with those that are merely functional.

Functional Disorders of the Digestive Organs—Infantile Indigestion.—The infant, as well as the adult, is subject to a train of symptoms arising in consequence of disagreement of the food, which, being unfit for the process of digestion, deranges the functions of the stomach, and is inadequate to supply nourishment. This may result from the quality of the food being such as to be unsuited to furnish the necessary supply of nutriment, or being unfit to undergo the digestive process—the infant perishing for want of sustenance, or in consequence of the disorder of the stomach and bowels, induced by improper food.

The first form occurs with infants at the breast, who are not provided with wholesome milk; the other with children who are improperly or too soon fed; and this usually takes place at the time of weaning. Hence we would divide infantile indigestion into two varieties; the indigestion of suckling, and the indigestion of weaning.

Indigestion during Suckling.—Infants at the breast are often observed to look pale, lose the firmness of their flesh, and become emaciated. They are peevish and fretful, and constantly cry until they receive the breast, for which they show great avidity, seizing the nipple with force, and sucking eagerly; but this seems to avail them little, either in appeasing their hunger, or affording them nourishment. The more they suck, the more does their food disagree with them, being soon rejected from the stomach, or passed by the bowels in a curdled state. Griping, flatulency, and acidity soon attend; and a protracted diarrhœa sets in, which carries off the infant in a period varying from two to four weeks.

Such a state of things is often witnessed in infants suckled by nurses who are out of health, whose milk is too old for the infant, or who do not observe the rules already laid down for the management of infants at the breast. It is at foundling hospitals, or among the nursed children of the poor, that we have extensive opportunities for observing such cases, many dying annually from this cause during the first months of infantile life. In fact, these children die of starvation. The milk they get is unable to sustain them,—and tormented by hunger, they seek in vain to supply the deficiency by the quantity taken, until the overloaded stomach and bowels become irritated, or at length inflamed. Many, however, die merely of inanition, no trace of inflammatory action being visible after death; but the intestines being found, like the integuments, blanched and attenuated; the mucous membrane being soft and friable, in the state of white ramollissement already alluded to.

Diagnosis and Prognosis.—This disorder is distinguished by the absence of inflammatory symptoms during life, or the traces of them after death; and by originating in the want of nutritious properties in the food, not in its irritating qualities.

Our prognosis may be favorable, if the true nature of the case be early detected, and the cause removed by procuring a good and healthy nurse; or substituting the best mode of artificial feeding, as already specified. On the contrary, little hope of success can attend the method too often adopted, in which the symptoms are attempted to be met by alternate laxatives and astringents, while the cause remains undetected, or unremoved.

Treatment.—If much purging be present when we first see the infant, this must be checked; and a mixture of soda with opium will answer best. Derangement of the biliary secretion may be met by small doses of mercury with chalk, sparingly employed; but if the child be much reduced, some tonic, as small doses of the quinine mixture, or a little weak chicken broth, will be required: great caution, however, is necessary in administering any stimulating food, however nutritious, as irritation thus caused would interfere with the process of digestion, and give rise to the train of symptoms so commonly seen at the period of weaning, and which constitutes our second variety of infantile indigestion.

Indigestion during Weaning.—Any sudden change of diet, even in the adult, is liable to be attended with derangement of the digestive organs, especially if the food given be indigestible or irritating. Much more is it likely to occur in the infant, whose intestinal mucous membrane is so sensitive and vascular. This risk all children have to pass through at the period of weaning, or when artificial food comes to be substituted for the breast milk.

The irritability often attendant upon teething may predispose to such disagreement, if the change of food be made at this time; but there is no necessary connection between dentition and the derangement of bowels so often attendant upon weaning, as this occurs equally when artificial food is injudiciously given before as after the teeth have appeared; and is the more likely to be induced, the earlier and more suddenly the infant is weaned. There seems more reason in the connection established between the rapid development of the glandular system going on at this period, and the susceptibility of the bowels, as the muciparous glands of the intestines partake of this general activity, and are found about this time undergoing rapid enlargement, and in a highly sensitive state. Hence these glands are peculiarly liable to become irritated; and from their irritation arise some important peculiarities observed in the bowel complaints of children.

This derangement, attendant upon weaning, has been long the subject of popular observation, and known under the name of *Weaning Brash:*—the *Atrophia Ablactatorum* of Cheyne, who thus translates the popular name, in his essay on this disease, published in 1802.* But the history of the symptoms and appearances detailed after death in the majority of the cases observed by Dr. Cheyne, shows the disease described by him to have been of an inflammatory character, or to have arrived at an inflammatory stage, thus differing from the form of complaint we have at present under consideration, and hence requiring a different line of treatment.

The relation between the supervention of weaning brash and the autumnal season is so remarkable, that Dr. Cheyne doubts the existence of the disease at any other period of the year; and suggests that the weaning of delicate children should, if possible, be put off until this season has passed. The advice is good, in consequence of the greater liability to bowel complaints during the autumnal months; but such will occur, as the result of improper food, at all seasons, as we have witnessed.

When food, in too great quantity, or of improper quality, is given to a child, the stomach becomes oppressed; and more or less of sickness or fever ensues, until the offending substance is rejected from the stomach, or, being carried into the bowels, is passed from thence. Thus vomiting or purging commonly result, in the first instance; and it is well they should, being the efforts made by nature to get rid of the cause of injury. Flatulency with pain or spasm, often attend in addition. Thus, much sympathetic irritation is induced; and this may amount to such a degree as to cause convulsions, which not unfrequently result from an indigestible meal given to a child.

Did the distress thus induced disappear with its cause, all would be well after the child had been vomited or purged; but the irritation of the stomach and bowels, once set up, may continue; and often involves other organs, particularly the liver, whose functions are usually more or less deranged. Thus the matters ejected from the stomach are frequently yellow or green, being tinged with bile; and the stools are very yellow, or oftener of a deep grass-green color; so much so, that this form of purging has got the common appellation of "*the green scour.*" On the other hand, the biliary secretion is at times suppressed; the stools being light or clay-colored, thin and watery, or thick, like half-boiled flummery. When the true source of the malady is overlooked, and the improper diet persevered in, under the idea that the derangement of the stomach and bowels arises from teething or some peculiarity in the constitution of the child, (as is commonly thought,) a confirmed state of indigestion is established; and the child rapidly emacites, the skin grows harsh and dry, the belly becomes tumid, and constant diarrhœa or vomiting is established.

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* See Cheyne's Second Essay on the Diseases of Children.

The commencement of the disease is often deferred for some time after weaning, not appearing until a month or six weeks have elapsed, when the continuance of the unwholesome diet at length produces the derangement of bowels, which, in other instances, immediately follows its use.

Symptoms.—A purging of green matter is generally the first symptom; but after some time, a retching or vomiting is added; the matter rejected being often tinged with bile. The diarrhœa sometimes ceases when the latter becomes established; or it only occasionally occurs. Short periods of troublesome constipation are not unfrequently interposed. The child is peevish and restless, often cries, and has a settled discontent of countenance, indicative of pain. There is much disinclination for food; but it shows a desire for cold drinks. Little fever, however, in general attends. There is some evening exacerbation; but the pulse is scarcely affected; nor is there much heat of skin; and the extremities are disposed to be cold. The belly, though full, is not tender, and the tongue may continue clean and moist, or only a little whitened; but aphthæ, after a time, usually appear.

Diagnosis.—The great emaciation and feebleness of the infant, with the constant whine, and countenance expressive of pain, are the most prominent characters of the case. Such a disorder cannot long exist without organic disease being induced. Irritation leads to inflammation, and intestinal ulcerations ultimately ensue; but many children die with the foregoing symptoms, from mere functional disorder, without signs of inflammation being present during life or to be traced after death. In these cases the intestines are found empty, pale, and transparent: in some parts inflated by gas, in others much contracted, as if by spasm; one portion being involved in another, so as to form intus-susceptions, but without any inflammation or adhesion of the parts involved. The disease is often protracted to a month or six weeks, the finest infants being in that time reduced to the most wretched state of marasmus; but when vomiting is added to the purging, the case may assume the character of cholera, and will often terminate fatally in a week or fortnight. When a child dies under these circumstances, the head almost always becomes engaged, coma or convulsions being present; but this is only a secondary affection, and not dependent on any inflammatory action,—a state of venous congestion, with slight effusion into the ventricles, being the appearances found on dissection.

Prognosis.—When we are consulted in such cases sufficiently early, and are able ourselves to determine on the absence of organic disease, our prognosis may be favorable, as by removing the source of the symptoms, in the improper food administered, a great advance is made towards effecting a cure; and it is surprising from what a state of exhaustion an ill-fed infant may be recovered. We must not, however, be deceived by a cessation of purging which occasionally occurs a few days before death, but without materially amending the child's condition, or retarding the fatal result.

Treatment.—The substitution of a healthy nurse's milk, (when the child is not too old,) or asses' milk with weak broth, free from fat, thin arrow-root, and barley-water, (with gum or isinglass dissolved in it,) for drink, instead of the food with which the child has been fed, are the principal changes requisite in the diet. Milk, in general, disagrees, and when given, should be previously boiled, and diluted with one or two parts of water. Boiled bread and milk, or even rice milk, though often recommended, we have frequently found to disagree. When the stomach is irritable, and much thirst present, a little cold water is the best and most grateful drink. In protracted cases, a good drink may be made by scraping some flour, which has been boiled in a napkin, and allowed to become dry, into equal parts of milk and water, and then boiling and sweetening the mixture. In general, little sugar should be used, and that of the best quality.

Medicines.—Our object, in the first instance, should be to check the vomiting and purging as speedily as possible, and allay the irritability of the mucous membrane. For this purpose, opium is a chief resource; and when used with the cautions already specified, we need never hesitate as to the utility of its employment. Hufeland, in particular, commends opium in diarrhœa, consequent on weaning, or induced by unwholesome and ill-regulated diet—the kind of case now under consideration. The safest and most immediate way of checking the purging, when severe, will be by administering an anodyne injection, consisting of one or two ounces of mucilage of starch, with from two to four drops of laudanum, and then employing the following astringent mixture:—

No. 39.

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Aquæ Cinnamomi ℥i
Misturæ Cretæ ℥ss
Tincturæ Kino ʒij
———— Opii gtts viij
Syrupi Aurantii ʒij

Sumat ʒi—ʒij horâ quâque secundâ.

This medicine should be persevered in until sleep is induced, or the purging decidedly checked; it will then be sufficient to give it after each liquid stool.

If the stomach be very irritable, six grains of bi-carbonate of soda may be substituted for the chalk mixture in the foregoing formula, or the mistura anti-emetica (p. 123) employed.

The warm bath should be ordered every night, or night and morning, if the child's strength permit. Under all circumstances, fomentations to the abdomen, or the application of hot flannel, and friction with the warm hand, are of great service. Opiate liniments may, in protracted cases, be used with the best effect.

Having thus allayed the more urgent symptoms, and allowed the child opportunity for recovering some strength, we have time to look about, and regulate our line of proceeding according to the circumstances of the case.

The course just specified is that which we commonly pursue, and by which we have seen numbers of children speedily restored from great extremity, and after other means had failed. The purgative plan of treatment for such cases we never adopt, and are only surprised how any one who has witnessed its destructive effects can for a moment support it. Emetics we are equally cautious in employing. When a case has recently occurred, and can be distinctly traced to a meal of indigestible food, an emetic of ipecacuanha is doubtless a good measure to free the stomach, and lessen the risk of farther mischief. In the same way, a mild dose of rhubarb and magnesia, or a little castor oil, guarded by a drop or two of laudanum, is equally serviceable in freeing the bowels of indigestible contents, which may still lodge there, though diarrhœa has set in; but these are particular and obvious cases, about which no mistake can well be made. When the diarrhœa is established, we seldom use laxatives; and even in the occasional constipation, or rather cessation of purging, which at times occurs, we equally avoid their employment,—having often seen a diarrhœa brought back by a misplaced anxiety on this score, which could not again be allayed. The addition of a scruple of magnesia, or a drachm of tincture of rhubarb, to the astringent mixture, will, in such cases, obviate or remove the tendency to costiveness. The use of mercurials, whether given as purgatives, alteratives, or specifics, (as some seem to employ them in the bowel complaints of infants,) we consider a plan of treatment requiring equal caution, though we would by no means altogether forbid it. When the biliary secretion is much deranged, and the stools very foul, an occasional small dose of the hydrargyrum cum cretâ, or of calomel, is undoubtedly of service, by improving the biliary secretion, and thus tending to allay the irritation of the bowels; but we always guard the mercurial with a grain or two of Dover's powder, or from two to five of the compound powder of chalk with opium. If given alone we never employ the mercurial more frequently than every second night, and that only occasionally. Guarded by the opiates, as we have advised, it may, however, be used night and morning, or even three times a day, for some days in continuance; and under this plan of treatment, the stools soon lose their unnatural character, becoming consistent and less frequent, the irritability of the bowels quickly subsiding. The Dover's powder, or powder of chalk with opium, will, by themselves, however, often produce the same results. When we do employ mercury, our usual practice is to prescribe a grain of hydrargyrum cum cretâ, with one or two of Dover's powder, every night, or night and morning, and to employ the astringent or sedative mixture at the same time. The practice of persevering in doses of calomel, or hydrargyrum cum cretâ, so often pursued, as if this were a cure for irritable bowels in the child, we cannot but look upon as a most pernicious error, having repeatedly witnessed its injurious effects. The recommendation of the efficacy of this plan by Dr. Cheyne, in his Essay already alluded to, (which has doubtless led so much to the indiscriminate employment of mercurials in the bowel complaints of children,) arose from the circumstances of the cases described by him being really of an inflammatory character, or having passed into that state, and so requiring the administration of mercury for their cure; as will be specified when treating of the inflammatory affections of the abdomen.

When much debility is present, some stimulant is required, and this will be best effected by adding two or three drops of the aromatic spirit of ammonia to each dose of the astringent mixture already advised; or double that quantity of nitrous spirit of ether, or Hoffman's anodyne liquor, when spasms or hiccup attend.

Before having recourse to stimulants, however, we must examine whether the symptoms present may not have originated in an inflammatory affection of the mucous membrane, and truly indicate a case of gastro-enteritis. Upon this distinction will turn our line of practice, as stimulants must be interdicted if inflammation be present; and this may exist in conjunction with much apparent debility. As injurious, however, is the error of those who, taking every case of vomiting and purging in the child for one of gastro-enteritis, indiscriminately apply leeches, and have recourse to debilitating measures—an error that is irremediable in the young child under such circumstances. The employment of opiates, sedatives, and even astringents, is common to the two classes of complaint, the inflammatory or functional; and the external use of warm fomentations, stimulating liniments, or blisters, may also be looked on as applicable to both: but before we decide on applying leeches, or administering stimulants, we must see and determine whether the disease be inflammatory or not.

Cholera Infantum.—A disease of a very formidable character and well-deserving this appellation, is often to be met with in the autumnal months. It begins to appear at the latter end of summer, and seems to be nearly allied to the disorder of which we have last spoken. The greater number of cases occur in infants at the breast, more particularly those which are teething, or have been recently weaned: but that this disease does not necessarily arise from teething or weaning, though either may predispose to it, is sufficiently proved by its constant occurrence at the autumnal season, (and that season only,) when its attacks are not confined to infants that are teething, or have been weaned. Many cases are presented at the same time, the disease appearing as an epidemic, like other bowel complaints prevailing at this season.

Symptoms.—Its invasion is sudden and violent, and its course often rapid, soon terminating fatally, if not promptly arrested; but its progress may be protracted, and last with intermissions for six or seven weeks. At the time when the disease prevails, an infant is often presented to us, lying in the nurse's arms, completely prostrate, and as if about to die. The countenance is pale and shrunk, and the features sharpened; with a dark circle often about the lips or eyes, which are sunk, turned up, and half closed. The infant seems comatose, but is easily roused to consciousness, looking eagerly around, and appearing quite collected, but uneasy at being disturbed, and crying incessantly, until it again relapses into its former state. The pulse is slow, feeble, and may be irregular; but the respiration, though oppressed, is not unequal, and any suspicion which may have at first existed, as to these symptoms originating in a cerebral affection, is removed when we find, upon inquiry, that the attack began with purging and vomiting; the bowels being frequently moved, and nothing remaining on the stomach. The stools are at times described as running from the child like water: they may be yellow or white, but are much more frequently green, as if loaded with some chopped vegetable. The surface is cool, especially the limbs, which are at times quite cold; urgent thirst often attends; the belly is full, but not tender, though much sensibility of skin is present; the tongue is moist, and a little white, or of a blueish tint, and feels cold; the cry is feeble, or almost extinct.

This is an extreme case; and under such circumstances, it is not wonderful that death should speedily occur,—the infant perishing in twenty-four or forty-eight hours, unless prompt relief be afforded. In many cases, however, the disease is much milder, being gradual in its development, and slow in its progress. It commences usually by purging in these instances, the vomiting being subsequently added. Remissions of the disease occur; but the child continues restless and feverish, with evening exacerbations, and is subject to fits of drowsiness or oppression. The purging is occasionally absent, but again recurs, while emaciation goes rapidly on; and the child is at last cut off by an acute attack, or gradually sinks under the disease, after a lapse of three or four weeks.

Pathology.—This is obviously a species of cholera, and does not necessarily arise from inflammatory action, though symptoms somewhat similar may have their origin in an insidious form of intestinal inflammation, often ending in ulceration, as will be presently noticed. That cases of inflammatory affections of the bowels often occur in common with the cholera infantum, resembling it in symptoms, and appearing at the same time, is undoubtedly the case; and we must bear in mind, that the simple cholera itself, when protracted, is liable to become complicated with inflammatory action; but that the disease is not necessarily inflammatory, or even commonly so, is equally certain, and not less important to recollect, as it involves a line of treatment not usually employed, and in recommending which as well as in taking this view of the subject we differ from others. Cruveilhier has described this complaint under the title, *Maladie gastro-intestinale des Enfans, avec desorganization gelatiniforme*, having on dissection found the mucous membrane of the stomach and bowels in a state of ramollissement, or reduced to a disorganized pulp, but without decided traces of inflammation. In a few cases, some redness has been found on portions of the intestinal mucous membrane; but this appearance has been only casual, and therefore not necessarily connected with the disease. In general the mucous membrane is found pale and colorless, as if macerated in water, the intestines appearing almost transparent. The mucous follicles are natural, and even the softening of the mucous membrane is not always present, as has been pointed out by Guersent, who here differs from Cruveilhier.*

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* We find that Dr. Droste, of Osnaburgh, confirms the opinion which we were led to adopt from our observations on the Cholera Infantum, that neither the symptoms during life, nor the morbid appearances presented after death, indicate an inflammatory affection in this disease. He looks upon the state of ramollissement of the intestinal mucous membrane often presented after death, as caused by an affection of the nerves, which supply the coats of the intestines; but this supposititious origin of the softening of the membrane is less satisfactory than the opinion thrown out by Dr. Carswell, that the action of the gastric juice after death, has something at least to do with producing this result.—See "*Zeitschrift für die Gesammte Medicin,*" *&c. Hamburg.* 1 *Band. Heft* 4. 1836.

Diagnosis.—The cholera infantum is liable to be confounded with congestion of the brain, or effusion, and the child generally dies with symptoms nearly resembling those states; but consciousness will be found to exist to the last in this complaint, when the child is roused, and the history of the case will soon remove any doubts that may have been felt.

Our *prognosis* must be guarded in all instances, but need not be hopeless even in bad cases, if seen sufficiently soon; as recovery will often occur, no matter how much the child may be reduced, if sufficiently prompt measures be taken to support the strength and stop the evacuations; but if the disease has been protracted so as to allow time for organic change, and the strength be much exhausted, the case assumes a new and very unfavorable character.

Treatment.—The plan of treatment to be adopted in this complaint does not differ, in principle, from that required for the disease last described; but we must be more prompt in our proceedings, and our remedies must be carried much farther. In severe cases a moment is not to be lost in attempting to stop the purging and vomiting, while we at the same time support the strength, and supply stimulants if required.

The internal administration of stimulants requires some caution. Guersent altogether condemns stimulants and tonics; but our experience is quite opposed to this, unless where distinct signs of inflammation are present. On the contrary our practice now is, at once to use stimulants, in conjunction with opiates and astringents, and in a much bolder manner than we at first thought of employing them. The mixture prescribed below* is that which we commonly administer, the repetition of the dose being regulated by the effect. A teaspoonful is ordered to be given every hour, or half hour, until the purging and vomiting be checked, or sleep induced. The renewal of the medicine is then deferred until the symptoms recur, or the child awakes, uneasy or in pain. A protracted sleep frequently follows the second or third dose of the mixture, with remission of symptoms for several hours. The child awakes tranquil and refreshed, the vomiting often not recurring, and the next evacuation from the bowels beginning to assume a natural appearance. In extreme prostration, double the quantity of ammonia may be prescribed, or an equal quantity of the compound spirit of sulphuric ether be added. Port wine may be given in arrow-root; and brandy and water, or a little burnt brandy (where much irritability of stomach attends), will be found highly serviceable.

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* No. 40.

℞ Infusi Menthæ
Aquæ Cinnamomi ā. ā. ℥i
Tincturæ Catechu ʒij
Spirit. Ammon. ar. ʒi
Tinct. Opii gtts. xij
Syrupi Aurantii ʒij M.

The muriated tincture of iron, given in mucilage of gum, or with the decoction and syrup of marsh-mallows, has been administered in this *gastro-malacia* of infants, by some German practitioners, and its efficacy highly spoken of by Pommer, Herzt, and others. We cannot speak from experience of the effects of this medicine, but after the view we have taken of the disease, are ready to expect beneficial results from such a remedy; especially when we call to mind the astringent powers of iron in its local action on the parts to which it is applied.

External stimulation by warm applications, friction, liniments or blisters, may be needed and will always be found useful.

When reaction is restored, or symptoms of excitement occur, stimulants must be diminished or withdrawn; but their continued use, in lessened quantity, is often required, and the still longer employment of opium and astringents is in most cases necessary.

These cases must be often visited, and the effects of remedies narrowly watched. We distinguish between the narcotic effect of the opium and the drowsiness or oppression which attends the disease, by observing the readiness with which the child is aroused, and its consciousness on being disturbed; neither of which will be manifested while the child is under the effect of opium, the stupor being then continued, and the pupils usually remaining contracted, on the eyes being opened.

Again we are not to be misled by the suspension of the evacuations, or suppose that the child must be better, because the purging and vomiting have ceased. On the contrary this is an unfavorable occurrence, unless there be a corresponding general improvement, and in particular the drowsiness and oppression disappear, without being succeeded by restlessness or screaming. The purging and vomiting not unfrequently cease spontaneously, some time before death; but the state of sinking goes on, accompanied by great restlessness, or sudden accession of the symptoms affecting the head. The child may appear to die comatose, yet is capable of being roused to the last. In such cases we must rely much on counter irritation, or heat and stimulants applied to the extremities and trunk. In particular, hot fomentations should be applied to the head; or it may be enveloped in flannels, wrung out of hot water, and then sprinkled with turpentine, or spirits of wine.

We must be especially careful to avoid the exhibition of any purgative after recovery from infantile cholera has taken place, even though the bowels remain long confined: attention to this point cannot be too strongly urged.

Respecting the use of mercurials we have said nothing, because we never employ them in the severer cases of this complaint; and in its milder forms, only under particular circumstances, (such as have been already specified at p. 236,) and never unless guarded by an opiate. We have found it impossible to check the purging so long as any form of mercury was given, in cases which readily yielded to the treatment recommended, after the mercury had been discontinued.

Diarrhœa.—The forms of bowel complaints which we have hitherto been considering, appertain more particularly to the age of infancy, and arise chiefly from disorder of the stomach, or indigestion. We now come to consider diarrhœa as more properly connected with intestinal derangement, and occurring at any period of childhood—the disease indeed to which the child is most subject. Some object to treating of diarrhœa at all as a distinct affection, looking upon it merely as a symptom of disease. This, to a certain degree, is just; but it would be carrying our regard for pathology to a very inconvenient extent, did we omit to give a distinct notice of an affection of such common occurrence, and originating in such various sources, as diarrhœa—particularly when no traces of organic lesion are, in many instances, to be found after death; for diarrhœa may exist long as a mere functional disorder, and thus destroy life. It is such forms of the complaint that we now propose to notice,—diarrhœa, as a symptom of organic disease, being to be treated of elsewhere.

Symptoms.—The susceptibility and activity of the digestive organs, already noticed, predispose to render the effects of any cause of irritation quickly manifested in the child, by an increase in the abundance and frequency of the evacuations from the bowels. The mucous and serous excretions are copiously thrown out, the biliary secretion soon deranged; and, the irritation being conveyed to the muscular fibre, the peristaltic action is increased, and the stools are ejected with greater force as well as frequency. Some sickness of stomach usually attends, at least on a recent attack; but the stomach may altogether escape being disturbed, and the appetite remain good. More generally, however, the appetite is precarious, or lost; there is thirst, usually for cold drinks; the tongue is loaded, being white or yellow, with occasionally the sides or tip red, or aphthæ may be present. Flatulency, acidity, and griping, almost always accompany diarrhœa in the child. Heat of skin, particularly over the abdomen, is present, and an evening exacerbation usually attends.

Such is the state of things which is certain, sooner or later, to be observed, in the child who has been over-fed, or with whom the use of unwholesome food is continued. Impressions of cold, the retrocession of eruptive complaints, or the prevalence of catarrhal fevers, often lead to attacks of diarrhœa in children; but some difference is to be observed in the form of bowel complaint, according as it arises from one or other of these causes. Diarrhœa is also more likely to be connected with inflammatory action, or to lead thereto, when originating in such sources, than when induced merely by errors of diet.

Pathology.—When diarrhœa is severe, or has long continued, the child emaciates rapidly, the febrile symptoms become much aggravated, and their remittent form strikingly marked. The skin grows harsh, dry, and shrivelled; the features are greatly altered, so as to acquire a premature resemblance to old age; the belly swells, generally becoming hard and tender; while symptoms, more or less decisive, of organic lesion, make their appearance. In many cases, however, diarrhœa will destroy life, without any marks of morbid action being to be traced, the intestines being simply found thin, transparent, and in many parts much contracted, while in others they are inflated with gas. The bowels are usually empty of feces; and the mucous membrane is pale, or it may be softened.

The form in which diarrhœa is presented will depend on the part of the intestinal apparatus that most predominates in the morbid action. The mucous, serous, or bilious secretions may be deranged, and give to the attack a particular character and name; but these divisions, although found in nature and useful in practice, are not to be too literally regarded, as the character of the complaint is very liable to alter, when the attack is protracted; and, in particular, derangement of the liver seldom fails sooner or later to appear. Hence the necessity for a constant regard to the symptoms, and examination of the evacuations, the appearance of which should be a principal guide in directing the treatment. When the powers of digestion are very feeble, and the mucous membrane relaxed and irritable, the food may be passed unchanged, almost as soon as swallowed; but, in ordinary cases, diarrhœa consists simply of an increased frequency in the motions, which are feculent but loose.

Simple Diarrhœa.—When diarrhœa arises directly from the irritation or indigestible nature of the food, the stools are in the first instance feculent,—sudden and copious purging coming on, attended with some sickness of stomach and griping, the pain usually following the contents of the bowels as they pass along, and this form of the disease may be called simple or feculent diarrhœa. The abdomen in this case is usually found full, and it may be hard or irregular in shape, but not tense or tender. The fullness depends on the overloaded condition of the abdomen, which in fact gives rise to the diarrhœa, and will disappear therewith. Hardness or irregularity, when felt in the course of the colon, and communicating the impression of *lumps* being present in the abdomen, may be taken as an indication that hardened feces, or scybala, are retained in the bowels; and the stools should be searched for such, which will soon come away after the administration of a suitable aperient, should they not spontaneously appear.

If the cause of the attack be not continued, it may of itself cease, after a few loose and feculent motions; or it may be speedily put an end to by one or two doses of some mild aperient. When the use of improper food is persevered in, however, (as too generally happens,) or the irritation in the first instance has been severe, the looseness of the bowels is continued, and the discharges, though still feculent, begin to present other characters; but diarrhœa arising from this source is, for the most part, feculent at its commencement. The stools soon begin, however, to be charged with mucus; and this is one of the most frequent characters which purging assumes in the child—*Mucous Diarrhœa*, as it has been called, being common in childhood; in particular, at the time of teething, but not confined to that period, as Underwood asserts.

In this form of the complaint, the stools may consist solely of mucus, appearing like jelly, quite transparent, or lying at the bottom of the vessel, like semi-transparent mucilage. At first, some fecal matter will be present, and the stools be variously colored; but their tenacity and consistency is what gives to them their peculiar character. This form of diarrhœa is usually very acute; it may succeed the former variety, or be joined with it; but often sets in as an epidemic, prevailing at the same time with other affections of the mucous membranes. It may be accompanied with marked febrile symptoms, and connected with an inflammatory state of the mucous membrane, or a highly irritable state of the mucous follicles. Frequently, however, mucous diarrhœa appears independently of any inflammatory state, but connected with a superabundance of vitiated mucus, with which the stomach as well as bowels may be loaded, as is evidenced by what is vomited, as well as by the stringy evacuations passed by stool. The presence of worms may give rise to this form of irritation of the intestinal canal; and we should examine the stools, to see if any be present in such cases; which, however, they need not necessarily be.

So much irritation can hardly prevail as in either of these forms of diarrhœa, without deranging the functions of the liver, and causing a suspension of the secretion of healthy bile, or, what is more frequent, an inordinate flow, or a vitiated secretion. The stools are often of a bright yellow, or a grass-green color; but it is hardly necessary to denominate the diarrhœa *bilious* on that account,—this being an accidental, though common occurrence, during the continuance of either of the forms of diarrhœa just described. The stools often cause much pain, heat, or scalding, as they are passed; and hence the popular notion that acrid bile is the source of the malady; but the derangement of the liver and the flow of bile are, in themselves, but secondary occurrences, and, what is important to attend to, appear often to be connected with a state of high irritation, or even inflammation, of the mucous membrane, particularly of the duodenum or stomach.

The green color of the motions is commonly caused by acidity, and they smell sour when evacuated; or the acid may be generated after they are passed, and the stools become green when kept. But yellow and frothy, or very green stools, are often found in connection with *enteritis;* hence we should examine, in such cases, whether other evidences of inflammation be present; but not attempt to judge by the appearance of the stools alone, or, indeed, by any single symptom. Derangement of the liver causes much variety in the appearance of the stools, which may be dark brown, or even black, like pitch, and very offensive; nor is absence or deficiency of bile less remarkable in its effects. To this cause, principally, are to be attributed those pale-colored clayey evacuations, at times seen in children, and generally accompanied with constitutional disturbance. The fault, however, does not rest solely with the liver, which is often only secondarily affected, the primary source of the malady being disorder of the duodenum. A diarrhœa of this description, the stools being occasionally lumpy or pasty, though generally thin, is not an infrequent attendant on the cutting of the double teeth, as Underwood has noticed. Fever attends, appetite is lost, and the child rapidly emaciates; this being always an obstinate, and often a dangerous form of diarrhœa.

A copious discharge of thin, watery motions, often limpid or almost colorless, and occasionally intermixed with flakes or shreds, is often observed in infants, and, being accompanied by pain, has been termed in vernacular language the *Watery Gripes.* This form is truly a *serous* diarrhœa, arising from inordinate excitement of the exhalants of the intestines, and is nearly allied to the mucous diarrhœa, with which it may be mixed. It may, like it, occur in an acute form, or be the result of a state of atony, or debility of the exhalant vessels. This form of diarrhœa, in particular, is liable to be induced by sudden impressions of cold on the surface, if perspiration be suppressed thereby; or it may be brought on by cold or acid drinks, taken while the body is heated. The quantity of fluid passed by stool in this way is at times inordinately great, so that rapid emaciation and sinking ensue, the effects of the disease being like those of cholera, as already described, and to which it at first bears no small resemblance.

Occasionally we meet with diarrhœa attended by the discharge of very *white*, as well as very copious and thin stools. This variety seems to resemble the last; but the peculiarity of color appears to depend on more than the mere absence of bile—probably on some peculiar alteration in the glandular secretion from the intestines, more particularly, perhaps, that of the pancreatic glands, as some have conjectured. This kind of purging is always to be looked on in a serious light.

During the highly irritable state of the intestinal canal which gives rise to these frequent and copious evacuations, it is not wonderful to find the powers of digestion impaired, and the mucous membrane little able to bear the presence of matters which, at other times, could be endured with impunity or advantage. Accordingly, we often find, in these cases of diarrhœa, that the food is passed unchanged, almost as soon as swallowed; or, if at all digested, it is but very imperfectly changed into chyle, and even part of what is formed appears to pass before it can be absorbed. When this state of things existed, the term *Lientery* was applied of old, as marking a particular form of diarrhœa; but this circumstance does not belong peculiarly to any one form, but may occur in all. M. Capuron seems to think that it belongs especially to the variety attended with white discharges; but it occurs equally when the stools are serous. In fact, lientery exists whenever much excitability of the mucous membrane is present, and at the same time food is injudiciously given, which the stomach, being enfeebled, is unable to digest.

It is while laboring under these forms of diarrhœa, the stools being slimy or watery, but almost without color or smell, that children are presented to us in such a state of languor and distress, showing that tendency to coldness of the surface and sinking, to which infants are so prone when ill, especially with bowel complaints; and when we must without delay arrest the disorder, or the child will perish from inanition, dying convulsed, before organic change has had time to take place.

Severe pains and spasm often attend diarrhœa in the child. These may arise from the acidity and flatulency present, and amount to such a degree as to endanger life in the young infant. Violent screaming and convulsions are induced, or the child sinks as if suffocated from the oppression caused by inordinate accumulations of flatus; and which is sufficient of itself to cause death by asphyxia, in the young child.

In cases of *infantile colic*, the abdomen becomes excessively, or often suddenly enlarged, and is tympanitic to the touch: but in general the gas is felt to be unequally distributed through the bowels, and may be heard rumbling in the large intestines, or be perceived to escape from the mouth or anus. Pressure or friction with the warm hand gives relief. It is important to distinguish between these cases of flatulency, and the tympanitic state of the abdomen to be observed in the advanced stages of intestinal inflammation; for the general state of the child is not unlike in both,—as the infant may be found cold, languid, or fainting, with impeded respiration, (the face being swollen or livid, from obstruction to the circulation in the head,) in a severe case of colic with flatus, without any form of inflammation having been present. Acidity occasionally amounts to such a degree as to excoriate the lips, or redden the blue color of a dress worn by the infant. We have at times seen an attack of infantile colic become periodical, occurring at the same hour for several days in succession, generally at two or three o'clock in the morning, at which time the child would awake, screaming, the abdomen being distended with flatus: in a few cases, this occurred at four o'clock in the afternoon. We have not met with this kind of case, however, sufficiently often to look upon it in any light but that of a casual occurrence; but Dr. Dewees speaks of a distinctly periodical colic which attacks infants, coming on, in general, from four to six o'clock in the afternoon, and lasting three months; so that it has got, in America, the name of "the three-months' belly-ache."

When much irritation attends any form of purging, the peristaltic action of the intestines is increased, so that the stools which in the natural state are rather squeezed out from the anus, than actually passed, are now ejected with force, or even with violence, as if squirted from the bowels. Blood not unfrequently follows in these severe cases, and passes alone, or more commonly mixed with the stools. Needing, or tenesmus, frequently attends,—the stools being small, scanty, and with difficulty expelled.

Prolapsus ani, or coming down of the intestine, will occasionally result from irritation of the bowels; and this is not an uncommon affection with children who have suffered much from bowel complaints. Indeed children are commonly the subjects of this complaint, being more disposed thereto than adults, both from the nature and structure of the parts concerned: for not only are the viscera of the abdomen more voluminous, and the mobility of the intestines greater, in the child, but the resistent powers are less, the intestine not being so much curved, the sacrum more perpendicular, and the coccyx still movable thereon; while the connections of the rectum are less extensive than in the adult, in consequence of the imperfect development of the neighboring parts. Occasionally, a large portion of the intestinal mucous membrane is protruded, and this appears to be highly vascular; being presented in the form of a small pyramidal tumor, red and coiled, rather than in the shape of a circular fold, or two lateral flaps, as is most usual in the adult. If not judiciously treated, and soon returned, it may inflame, ulcerate, and even slough. Most of these symptoms of high irritation, however, and especially hæmorrhage, are connected with an inflammatory state of the bowels, and, when present, should induce a strict examination into all the symptoms.

Diarrhœa is liable not merely to be protracted, but to become chronic, and is often presented in an exceedingly obstinate form,—a state of constipation alternating with that of purging, which, however, is soon brought back by an error in diet, or induced by the exhibition of a purgative. In chronic diarrhœa, the great point to determine is, how far the relaxed state of the bowels depends merely on an habitual derangement of function, or want of tone in the parts, or continues to be kept up by the presence of irritating matters in the intestines, or a state of chronic disease in the intestinal mucous membrane.

Our *prognosis*, in diarrhœa, will depend mainly on the determination of the question, how far the disease, whether acute or chronic, has had its origin in inflammation. Even in severe cases of recent diarrhœa, if merely sympathetic, or induced only by the use of improper food, we may hope favorably, though the child be greatly reduced: in chronic diarrhœa, much will depend on the history of the case, and the probable cause which seems to keep up the complaint. When the purging appears to depend on want of tone simply, or on the irritability and consequently increased action dependent thereon, and especially if kept up by inattention to proper regulation of diet, or by the injudicious employment of medicines, we may look to a different mode of management as promising a favorable result. Children who have been long subject to attacks of diarrhœa, however, or who have suffered much from the disease in early infancy, rarely escape with merely functional derangement of the bowels; and though we may from time to time remove such attacks, we cannot promise too confidently, a perfect cure; as it will at times happen that, when least expected, an attack, apparently of no unusual severity, will carry off the child.

Treatment.—Diet.—Attention to diet is a chief point in the treatment of diarrhœa, no matter what be its form or duration. In regulating the diet, we will often remove the cause of the disease, which is commonly induced by improper food, and which may frequently be remedied by attention to this point alone; while no medicines will avail, if this be neglected. The principles on which to ground our regulation of diet should be to give food only in small quantity, of the least stimulating quality, such as is easy of digestion, and likely to leave but little residue behind. We have already stated some points to be attended to, with respect to diet, (see p. 235,) at the commencement of diarrhœa, but attention to this subject should never relax during the existence of the disease. In the more acute or recent stage, gum water and barley water, slightly sweetened, or a mixture of both, constitute at once the best food and drink. Arrow root, when made thin, and with water, may next be given, and is the best general diet, being a mild and nutritious food, and little liable to become acescent; but, unfortunately, children in general dislike arrow root, and it requires to be very carefully prepared, or they will not taste it. Milk, in any form, is likely to disagree in the first instance; even the breast milk may require to be diluted with water. Bread and milk, or rice-milk, are equally objectionable; but rice soon becomes a chief article of diet in diarrhœa, as it leaves scarcely any excrementitious matter; but it should be thoroughly boiled, and only moistened with a little water or broth. Light broths may be then tried, of which chicken broth is to be preferred; as also chicken itself, for animal food, when the child is old enough, and such can be borne. Chicken may be given with the rice, or some of the gravy of roast mutton. Vegetables are to be avoided, particularly potatoes, and acid or unripe fruits; for which, however, there is often a great desire, the appetite being frequently perverted in this complaint. Young meats, as veal or lamb, are indigestible, and therefore liable to disagree; and fish almost always does so, in consequence of the quantity of excrementitious matter left behind: but rules for the dietetics of children have been already laid down, and these are in particular to be observed with children who are subject to a loose state of bowels.

Keeping the surface warm, and the skin, if possible, in a lax state, is a great object in the treatment of diarrhœa, particularly when chronic; hence the utility of warm clothing, warm baths, fomentations to the abdomen, and friction. Liniments containing opium or more particularly an opiate plaster, applied over the abdomen, will be found signally serviceable in some cases, and may save the necessity for the internal administration of opium; but we must keep in mind that the injurious influence of this drug may be thus equally induced, and hence desist from its employment in liniment, or remove its presence as a plaster, should any symptoms of narcotism ensue. A flannel swathe round the abdomen is often of signal service, both from the warmth it imparts, and the support it gives to the contained viscera. The feet in particular, should be kept warmly clad.

The influence of change of air, and of a warm and equable state of atmosphere in removing obstinate diarrhœa, or preventing returns of the complaint, is most remarkable; and such change, when practicable, should never be omitted.

Medicines.—The primary qnestion respecting the medical treatment of a case of diarrhœa is, whether we should attempt its removal by the use of an aperient, or at once try to arrest the purging. We have already given an opinion on this subject. When the infant is very young, and the evacuations profuse, we must in all cases try to moderate the discharge from the bowels; and we know of no case in which the judicious use of opium for this purpose can be objected to,—opium being our safest, if not principal agent in such cases, whether given alone, or as an adjunct to other medicines. We may use aperients, as already recommended, (p. 244,) when diarrhœa is recent, occurs directly in connection with an overloaded state of the bowels, and is accompanied by feculent discharges. In full children that are over-fed, and in whom much fever accompanies the attack of diarrhœa, the aperient may require to be repeated two or three times, or occasionally renewed. So, in any case when lumps of feces appear in the stools, or they are loaded with depraved mucus, vitiated biliary secretions, or undigested matters, an aperient may be required; but it is not to be persevered in unnecessarily, nor administered as if it were a cure for the disease,—being, in truth, valuable only as removing one of the causes of the complaint, or sources of irritation. In the employment of mercurials, we must be regulated by similar principles, employing them occasionally to correct the vitiated condition of the secretions, and so tending to remove a source of irritation, but by no means to be persevered in longer than such effects arise from their use. When much mucus loads the stools, the addition of half a grain or a grain of ipecacuanha to each dose of the aperient, will be found a useful adjunct. This subject is treated of with much judgment in the article Diarrhœa, in the Cyclopedia of Practical Medicine.

We attempt to check diarrhœa by allaying the irritation that gives rise to it, or employing astringents for the purpose of stopping the discharges. In all cases, the first indication is to be fulfilled, if possible; and this will be best effected, as far as medicine is concerned, by the use of opium and the fixed alkalies or their carbonates. Potash or soda are preferable in the first instance; the carbonate of lime, either as compound powder of chalk, or chalk mixture, then becomes most available, and opium always adds to the sedative effects of these medicines; but even without opium, they exercise a decidedly sedative influence. This is particularly manifested when there is much tenesmus or irritation of the rectum, which is often quickly allayed by a few grains of carbonate of soda or potash, given in the starch injection, with or without opium; for we have observed that the irritation is much more effectually removed when the alkali is added, than when the opium is used alone. A small suppository, containing from the eighth to the fourth of a grain of opium, is often a convenient and effectual substitute for the anodyne injection with the child. The following is the form in which we prescribe soda in solution:—

No. 42.

℞ Aquæ Cinnam. ℥i
—— Menthæ ℥ss
Carbonatis Sodæ gr. x
Syrupi Aurantii ʒij
Tinct. Opii gtts. vj M

ʒi—ʒij horâ quâque secundâ.

Dried carbonate of soda may be given in powder, combined with compound powder of ipecacuanha; or ipecacuanha itself, when mucus is in the stools, or the skin is dry and harsh. If, in addition, much heat of skin and thirst be present, particularly when the palms of the hands or soles of the feet are hot, the use of nitre is of great advantage; but it should be guarded by opium, or well diluted in some mucilaginous mixture. Eight or ten grains of nitrate of potash may be added to the foregoing mixture, and the dose directed to be taken in some barley water, or thin gruel: and in the same way may be administered the following powders, which we have found very serviceable in diarrhœa, under the circumstances just specified.

No. 43.

℞ Carbonatis Sodæ sic. gr. i
Pulv. Ipecacuanhæ gr. ¼
—— Ipecac. comp. gr. i
—— Cinnam. comp. gr. i
Nitratis Potassæ gr. ij M

Ft. Pulveres tales sex. Sumat horâ quâque secundâ vel tertiâ unum.

In the more advanced stages of diarrhœa, chalk mixture is the preparation of this class on which most reliance is to be placed. When much mucus loads the bowels, lime water possesses some peculiar properties in effecting its removal.

The alkalies have the advantage, in addition, of being antacids, and as such are often required in the treatment of the bowel complaints of infants; but to prevent the generation of acidity, as well as to remove its presence, we must endeavor to restore the tone of the stomach, and allay its morbid irritability, by the use of narcotics and bitters.

The bitter infusions make excellent vehicles for the alkalies in such cases, and are not employed in the bowel complaints of children as frequently as they deserve,—having the power of restoring the functions of the stomach, while they correct the irritable state of the bowels. Of these bitters, the infusion of hop is particularly eligible for its sedative properties—that of gentian, or chamomile flowers, as a tonic; and the alkaline carbonates may be exhibited in either of these; but the bitter which most decidedly possesses an astringent power is the infusion of simarouba. This is not compatible with the alkaline carbonates; but one of the most useful compounds that can be employed, in protracted cases of diarrhœa, is a combination of simarouba, nitric acid, and opium, a prescription which common repute attributes to the late Dr. Baillie, of London. It may be ordered as follows for children:

No. 44.

℞ Infusi Simaroubæ ℥iss
Acidi Nitrici dil. gtts. iv—gtts. ij
Syrupi Caryophyl. ʒiv
Tinct. Opii gtts. vj M.

One or two tea-spoonfuls of this mixture to be given in some barley water, three or four times a day. Other mineral acids have been recommended as astringents, in cases of diarrhœa; but the nitrous acid decidedly deserves the preference, appearing to possess some power of allaying the irritability of the mucous membrane. Heat of skin and thirst, are abated, and the appetite soon restored, by the use of this medicine.

When diarrhœa has long existed, the use of turpentine is occasionally of great service, after other means have failed. In such cases, especially when much flatus attends, we would particularly recommend the use of the terebinthinate mixture, (p. 125,) to which might be added a few drops of laudanum.

The medicines most commonly employed to act directly as astringents, however, and check diarrhœa, are the preparations of kino or catechu; and here it may be proper to state the circumstances that contra-indicate an attempt to stop the purging. These are, when diarrhœa is of long standing; when the discharge appears beneficial or critical, as the looseness of bowels that often attends dentition; or the copious liquid evacuations which occasionally accompany the resolution of intestinal inflammation. Respecting long standing diarrhœa, we may observe, it is not easily arrested in general; and we need not fear attempting to do so, if we only watch the effects of remedies, and desist, should febrile symptoms, or disturbance of any important organ ensue—a rule to be regarded in all cases.

The diarrhœa attendant on dentition need not be interfered with, unless profuse, and the infant much debilitated: but we should recollect, that severe purging is liable to occur at this period, independently of any irritation in the gums, and which requires prompt treatment, as already pointed out.

It is in the case where the head becomes engaged during the existence of diarrhœa, that the greatest caution is required; and we must carefully examine into the symptoms, to determine whether they arise from sympathetic irritation, or from exhaustion in consequence of inordinate evacuation—in fact, whether the symptoms be *hydrocephalic* or *hydrencephaloid.* In the latter case, the purging is to be arrested, and stimulants given, without delay: in the former case, we should hesitate about suddenly checking the discharges from the bowels; but we should try to allay the irritation, and moderate their flow, by the use of the alkaline solutions, or small doses of mercury, opium being added with much caution. In the same cautious manner we must proceed, where the evacuations are connected with an inflammatory affection of the bowels; but the particulars respecting this case belong to the next division of our subject.

Allowing for these exceptions, we have no hesitation in recommending the use of astringents, particularly kino or catechu, in the bowel complaints of children. From half a drachm to a drachm of the tincture of either, may be added to each ounce of the alkaline mixture recommended at page 251, and given in all cases where the purging is severe, even though much general excitement at the same time be present. This excitement depends much on the state of irritation of the mucous membrane, which also leads to those alterations in the secretions so usually manifested by the appearance of the stools, and to which the irritation has been attributed as a consequence, whereas it is commonly the cause. Accordingly, we constantly find the stools quickly becoming consistent, and assuming a natural character, as well as diminishing in frequency, under the use of this astringent compound, without the employment of a grain of mercury, though these effects are commonly considered as peculiarly belonging to the influence which this medicine exercises over the functions of the liver. In fact, we would support our view by the line of argument adopted by those who advocate mercury exclusively—they give mercury to alter the secretions, and so lessen the irritation; we give the medicines just recommended, to lessen the irritability of the bowels, and so alter the secretions, commencing as we conceive, at the right end.

It is a different case where the source of the symptoms has its origin in an inflammatory affection of the mucous membrane —there, other measures become necessary; but it remains to be seen, even in such cases, whether astringents be necessarily excluded. We have the authority of M. Bally in favor of the utility of kino in relieving diarrhœas accompanied by inflammatory and febrile symptoms,—the class of abdominal affections which we now proceed to consider.

Inflammatory Affections of the Digestive Organs.

When diarrhœa has existed for some days in an infant, and febrile symptoms suddenly set in, we have good reason for suspecting inflammation, and should look for the symptoms that characterize enteritis. To determine the existence of an inflammatory affection of the stomach or bowels, however, we must take all the symptoms and the history of the case into account. We have seen how severe the sufferings may be in mere functional disorder of these organs in the infant; and on the other hand we shall find, that intense inflammation may exist, so as to destroy life, or lead to irremediable organic change, and yet be accompanied with few symptoms calculated to arrest attention or point out the serious nature of the malady. A child will perish, in such cases, with little apparent cause for the fatal result; which is commonly attributed in a vague manner, to an affection of the head.

Symptoms.—Inflammatory affections of the abdomen occur in very young infants, and are perhaps most common in those under six months old. In such young children, the symptoms are chiefly local, and often obscure; there is little constitutional fever, and the pulse, in particular, is seldom disturbed. When, however, we find a child with a belly, full, tense and tender to the touch,—uneasy, and not liking to be moved,—lying on its back or side, with the legs drawn up, and affected with purging and vomiting, we have little reason to doubt that the case is one of intestinal inflammation. This we can have no doubt of, if we find, in addition, the skin, particularly over the abdomen, very hot, the tongue dry and red, with thirst, and an erythematous redness round the anus. The fever will be more distinctly marked the older the child is; and the symptoms will vary in their character, according as the inflammation is situated in the stomach, or some particular tract of the intestinal canal; and, again, according as the inflammation is simply one affecting the mucous membrane, or involving an affection of the mucous glands.

The acute febrile symptoms, even when present, often soon cease, and give way to those of sinking, with much prostration of strength, the skin becoming cool or livid, and the belly losing its tenderness, but remaining tympanitic; the evacuations from the bowels may cease, and symptoms of convulsions or cerebral congestion set in. When children are presented to us in this state, the previous history must be a chief guide in determining the true nature of the case.

Gastritis.—Inflammation of the mucous membrane of the stomach may occur alone, but is usually accompanied by inflammation of the bowels. Gastritis may be met with in the youngest infant, and seems, in such instances, generally to arise in consequence of a state of congestion of the mucous membrane with which the child has been born. The symptoms which in particular characterize gastritis are, pain upon pressure over the stomach, which makes the child wince, or cry, the more so, the more we press; and vomiting immediately on taking food, or soon after, accompanied by distressing hiccup. This symptom, however, is not common; and there may be no vomiting, nor even dryness or redness of the tongue,—nor any febrile symptom, if the infant be very young. In those more grown, the nature of the case is made clearer by heat of skin, dryness and redness of the tongue, and perhaps quick pulse, with intense thirst, particularly for cold drinks; but in severe cases, the smallest quantity of fluid may not be borne by the stomach. There is great restlessness, with occasional stupor. The bowels may be costive, or the stools natural.

Enteritis occurs much more frequently than gastritis, and may exist without it; but more commonly both are combined, constituting a case of gastro-enteritis. According to M. Billard, this combination occurs in children nearly twice as frequently as enteritis alone, and ten times as frequently as gastritis. In enteritis, the tenderness over the abdomen is situated lower down, is more diffuse, and often less acute than in gastritis. The skin uniformly is dry and hot, particularly over the abdomen, which soon becomes tense or tympanitic. In this affection the legs are drawn up, and the countenance peculiarly expressive of distress. Much thirst is felt, and hot drinks are occasionally preferred. The pulse is never quickened in very young infants, seldom so in those even after six months. Vomiting is often present in enteritis; but not so frequently as in gastritis, nor does it occur so immediately after taking food. The matter vomited is often yellow, and may occasionally be fecal. The state of the bowels is very variable. The stools may be natural, but generally are much depraved in appearance. Costiveness may attend, but most commonly diarrhœa is present,—the evacuations being thin and frothy, and of a yellow, or more frequently green color. There may be neither redness nor dryness of the tongue, nor disturbance of the stomach; but when gastritis is conjoined, or has been superadded, the symptoms which characterize that affection are combined with those belonging to enteritis.

Some varieties in the symptoms of enteritis are to be observed, according to the tract of the intestinal canal in which the inflammation is seated; and this is found very frequently to be in the ileum, particularly in its lower portion. It is not, however, easy to determine this point, especially in a child; but it is important to have some clue to guide us in our investigations; for these affections of the ileum are of common occurrence, and very insidious in their nature, frequently leading to a fatal result without their existence being suspected during life.

Ileitis.—This affection is seldom met with before dentition has commenced. It is to be distinguished as much by negative as positive signs,—the general symptoms of an abdominal affection being present, without those denoting inflammation of the stomach or of the large intestines. The child is hot, particularly over the abdomen, and some tenderness may be found, on pressure, between the umbilicus and crest of the ileum; but neither the heat of skin nor the tenderness are remarkable, and there is a tendency in the surface to become cool, and in the extremities to grow cold. Tympanitis is uniformly present, and soon sets in. There is thirst, but not for cold drinks; hot ones are preferred, and this is accounted a distinctive character of this affection. The tongue is usually white on its upper surface, but red at the edges and tip, and pointed. In the child, little febrile action is present. The pulse may be small and quick, with in general great prostration of strength, the features being sunk and contracted. Neither vomiting nor purging necessarily attend; but when a child that has been feverish is affected by diarrhœa, accompanied by greater debility than the diarrhœa could account for, we may suspect ileitis. The state of the urine serves as a diagnostic, being scanty, high-colored, and often so distressing in this case, as to lead to the supposition that the kidneys may be affected. This symptom is particularly dwelt upon by Dr. Stokes, in his Lectures, as belonging to ileitis; and though observations respecting the urine are not so easily made in the child, we have seen the value of this symptom verified. When vomiting attends, the matter rejected may be feculent, in consequence of the obstruction offered to the passage of the feces by the tumefaction of the ileo-cœcal valve, which the inflammation causes when seated therein.

If the inflammation extend farther, and engage the mucous membrane of the large intestines, the case assumes a new character and a new name. It now becomes one of dysentery, or of *colitis*, according to more modern nomenclature. Inflammation of the large intestines, however, rarely occurs alone, being in general combined with that of the small intestines, and entero-colitis is, according to M. Billard, nearly as common a disease in the child as enteritis. In this complaint we universally have tumefaction of the abdomen, and pain on pressure, with that redness around the anus which attends on irritation of the lower portion of the intestines, and seems caused by the alvine evacuations. The pulse is seldom raised, and is often feeble. The skin is generally hot and dry, but has a tendency to become cool or livid. This is particularly remarkable when the inflammation is confined to the large intestines; and in this case the tympanitic swelling of the abdomen is at first less constantly observed: neither does vomiting often occur, though occasionally present. Vomiting, however, often attends when the small intestines are involved in the inflammation; and the tongue will be red and dry, though no gastritis is present: but the vomiting does not occur on taking food, and the matter ejected is usually yellow. This is also the general color of the stools, which are, however, often green,—diarrhœa being a frequent, though not constant, attendant on these cases. Much irritation is present; the stools are passed with pain, or ejected with force, accompanied by straining or tenesmus; or only a little mucus, tinged with blood, is evacuated.

Hæmorrhage often accompanies intestinal inflammation in the child, and may amount to an alarming degree; but generally, only a little blood is mixed with the stools. When blood is passed, it indicates a high degree of irritation or inflammation of the mucous membrane, particularly of the large intestines; but in very young children copious hæmorrhage may occur in consequence of congestion merely, independently of inflammation.

The sympathetic relations of gastro-intestinal disease are particularly important in the child, being very liable to occur, and very severe when they do take place; so as often to obscure the original disorder, the local symptoms of which become so much lessened on the occurrence of the sympathetic irritation, as to be frequently quite overlooked, the case being treated altogether as a cerebral or thoracic affection.

Diagnosis.—The head is especially liable to become engaged in cases of intestinal inflammation occurring in the child, the symptoms of cerebral disturbance apparently possessing the severity and assuming the character of acute meningeal inflammation, into which sympathetic irritation would soon merge, if the state of the head were neglected, or the true nature of the case overlooked. When inflammation of the stomach or bowels in the child runs high, or is accompanied by decided febrile symptoms, we soon perceive the child to become restless and uneasy; it cries out, or starts in its sleep; the head is hot, the eye wild, or it looks fixed and rather sunk; there is intolerance of light or sound; with tossing of the head, spasms of the limbs, or convulsive movements. An inexperienced or inattentive observer would have no doubt that the head was the seat of disease; but attention to this alone will not remove the symptoms, so long as their origin in gastric or intestinal disease is overlooked. We have already noticed the cerebral symptoms resembling those of effusion, which may accompany the state of exhaustion induced by the presence of abdominal disease, and shall have again to recur to them, when speaking of the hydrencephaloid disease. The respiration is always more or less hurried in acute affections of the abdominal viscera in children. The breathing is rapid or oppressed; there is palpitation, and often cough of an irritative and harassing kind; but we observe that the respiration, though apparently impeded, is carried on by the thoracic, not abdominal muscles; and we find, on examining the chest, an absence of those signs which indicate pulmonary inflammation. Examination by the stethoscope should be duly made, and our treatment directed accordingly.

Whatever tract of the mucous membrane be the seat of the inflammation, its form may vary; and according to the form of the inflammation, a difference will be observed in the progress of the case, and the appearances found after death, when the result has been fatal. The simple or erythematous inflammation may end in resolution, when the case proceeds favorably,—the symptoms becoming milder, perhaps accompanied by copious discharge from the bowels; or, the inflammation may become chronic,—the symptoms growing milder, but still persisting in a greater or less degree. When the case has terminated fatally, we observe on the mucous membrane traces of inflammatory action more or less distinct.

Morbid Appearances.—There may be a ramiform redness of some portions of the membrane; or the redness may appear to be caused by injection of the capillary vessels, and this is considered as indicating a severer form of inflammation; or the redness may be seated in the tissue of the mucous membrane, and be disposed in patches, points, or red lines. These red patches are distinct, often ending abruptly, and when seated in the small intestines, may be perceived through their attenuated coats; but when situated in the stomach, no external mark is visible.

The stomach is often found distended with gas, but may be contracted; and when it is so, the creases of the mucous coat will be of a deeper color than the other parts. In slight cases of inflammation of the small intestines, the valvulæ conneventes alone are discolored. In severe forms of intestinal inflammation, disorganization of the mucous tissue, or gelatiniform ramollissement may occur,—the membrane being reduced to a soft, discolored mass, easily coming off like a red pulp, and leaving the coats of the stomach so fragile and thin, as readily to give way on the slightest pressure. Perforation of the stomach may thus occur during life ; and young infants sometimes perish suddenly from this cause.

Gangrene is a rare consequence of intestinal inflammation in children at the breast ; but in those more grown, it is not of unfrequent occurrence, if the inflammation has been severe, or stimulants have been administered, in consequence of the nature of the case not having been understood. Gangrene may occur as the result of gastritis : but is most frequently observed in the small intestines, near the termination of the ileum ; complete perforation of the intestine, with escape of its contents, thus ensues.

The papillæ or villosities of the mucous membrane may be enlarged or tumified ; and that form of inflammation which leads to altered secretion, and constitutes the disease which is denominated muguet, occasionally occurs in the mucous membrane of the intestinal canal, but very rarely, compared with the frequency of its occurrence in the mouth. It may be found in the stomach ; but, in these cases, it generally passes down the œsophagus, which will be often found affected with the disease, without its having extended to the stomach. It may be met with in parts of the intestines, but is of very rare occurrence. We judge of its presence by seeing this peculiar white secretion passed by stools during the existence of enteritic inflammation.

The alteration of the glandular apparatus of the bowels, analogous to what constitutes aphthous ulceration in the mouth, is often met with both in the large and small intestines, particularly the latter ; but is less liable to occur in the stomach. When aphthæ appear in the mouth during the existence of enteritis, they often indicate a similar state of some part of the intestinal mucous membrane, generally in the small intestines. When aphthæ appear at the verge of the anus, the large intestines are more likely to be their seat ; but they may appear in the mouth, or anus, without occupying the intermediate tract.

The lining membrane of the stomach and bowels, when inflamed, is generally found covered by an adhesive mucus. The extension of the inflammation to the mucous follicles is of frequent occurrence, and constitutes that important variety of intestinal inflammation, which has got the distinguishing epithet of *follicular*. This affection of the mucous glands frequently takes place in children, and is often an unsuspected source of danger in infantile disease. These mucous glands are scattered over the membrane singly, or in patches. In the stomach and large intestines they are isolated; but occur in clusters in the small intestines, and, when inflamed, appear slightly elevated, like small reddish pimples, with a spot or orifice in the centre. When about to ulcerate, they soften, become white, and sink in the middle, or suppurate,—appearing often like a brown slough or eschar, but without surrounding swelling. This form of disease is not common in the stomachs of children. Some cases, recorded by M. Billard, occurred in very young infants, and seem to have been attended with great debility, but without purging or vomiting.

In the intestinal mucous membrane of children, however, this form of ulceration is often met with, and is a common termination of enteritis, particularly when seated in the lower third of the ileum; but it may occur in other parts of the small intestines, and also in the large,—ulceration of this form being the lesion on which is found to depend chronic diarrhœa, or dysentery, in most instances where they end fatally, particularly the latter disease. These mucous follicles are hardly to be perceived just after birth, but increase in size as the infant grows older, and seem to undergo rapid development about the time of dentition, as already remarked. These glands may be excited or irritated, particularly about this period, without being actually inflamed, or passing into ulceration; and to this excitement of the intestinal glandular apparatus, and consequent increase of their secretions, is in a great measure to be attributed the copious watery diarrhœa of infants. Under these circumstances, the highly irritated glands are very liable to become inflamed, and much judgment is required in the management of the case. Suddenly arresting the discharge might tend to this effect; but the debility often induced by the inordinate evacuation from the bowels, imperatively demands attention to this point. During the progress of febrile attacks, and often in the course of remittent fever, the follicular glands, particularly in the ileum, are liable to become inflamed, and to pass into ulceration. Such morbid conditions are not unfrequently the cause of those protracted illnesses, in children, which go by the names of worm or bilious fevers.

Dr. Crampton gives an account in the second volume of the Dublin Hospital Reports, of an affection of the glands of the intestines occurring in children, during the prevalence of fever, in the year 1818. The ages of the children varied from three to eight years. The mucous membrane was found in many places highly vascular, and covered with granulations of a yellow color, as if a coating of yellow wax adhered to them: in others, the granulations were of a dirty white hue; and in several, ulceration had taken place, and was disposed in patches of small ulcers, with well defined edges. In cases which terminated favorably, a quantity of "yellowish, branny scales" was observed in the stools, floating on the liquid discharges, "like minute portions of wax from honey-comb." This appearance in the stools of children affected with dysenteric fever, Dr. Crampton had before observed, and often witnessed during the catarrhal fever which prevailed in Dublin in the year 1818. It does not appear that this morbid condition was the cause of the fever, as it existed independently of any febrile disorder, in some instances. When attended by fever, there was unusual abdominal tenderness, loaded tongue, intense thirst, occasionally vomiting, but more frequently diarrhœa, tenesmus, slimy and green stools, mixed with blood. "When remedies proved ineffectual, a true dysenteric state became established, the tubercles on the mucous membrane were converted into ulcers, and the patient died in a hectic, emaciated condition." Acute attacks of mucous or serous diarrhœa, attended with much excitement, and soon assuming an inflammatory character, are often met with among children during the prevalence of catarrhal fevers, or after attacks of measles, scarlatina, &c. &c. The disease may assume a dysenteric form, and appears to be contagious. When, during convalescence from such disorders, we find a child losing his appetite and flesh, while symptoms of remittent fever begin to show themselves, and then diarrhœa sets in, we may suspect a morbid condition of the mucous membrane of the small intestines, involving the muciparous glands, and should be on our guard accordingly.

These various forms of intestinal inflammation are liable to become chronic. The child then emaciates rapidly; the skin grows harsh, dry, or dirty looking, and the limbs are wasted; but the abdomen is full, and may become hard or tense. There is thirst, with loss of appetite, or it is very precarious. The tongue is loaded, or dry and red; the lips are parched and chapped, and often excoriated from being picked. The bowels are much deranged, diarrhœa being generally present, with foul and unnatural stools, often mixed with blood. The fever is decidedly remittent; aphthæ often appear in the mouth, or may be seen on the verge of the anus; and if the case be mistaken or mismanaged, every symptom becomes aggravated, and the child perishes in consequence of an acute attack, or dies, worn out by the fever,—the head or chest becoming, in general, engaged towards the termination of the case.

Prognosis.—The difference between inflammatory and functional disorders of the digestive organs, in the child, is not less important as regards practice, than as regards prognosis. No matter how severe are the vomiting and purging, they may often speedily be stopped, if the belly be not tense and tender, nor other symptoms of inflammation present; but when such attend, we gain little by merely checking the evacuations, which it may be even dangerous to attempt, so long as the inflammation is allowed to persist. In inflammatory affections, the danger is in the first instance from the acuteness of the attack, which often leads to a fatal result if not speedily arrested. When met by adequate means, however, the inflammation tends to resolution much more than to become chronic, in the child; but we need not despair, should it take this turn, and even organic disease be set up: for ulceration of the mucous apparatus of the intestines, though a dangerous, is not necessarily a fatal disease, especially if its true nature be clearly ascertained. This is of more importance, as regards treatment at least, than attempting to determine the particular portion of the intestinal canal that may be the seat of the inflammation or ulceration; which it is especially difficult to do in the child. It makes little difference in our treatment, however, what particular part is affected, if we can only determine what the nature of the affection be, and thus decide whether we are to employ directly antiphlogistic remedies, or not.

Treatment.—The first question is, whether leeches are to be employed in the treatment of the case, and how they are to be applied. When the symptoms are decided, the case acute, and the child a little grown, or very robust, we should never omit the use of leeches in the first instance. A repetition of the leeching is preferable to allowing any lengthened flow of blood, which may run down the child, without arresting the disease: hence care is required when leeches are applied to the epigastrium; and we should ourselves superintend the operation, so as to be able to stop the bleeding as soon as necessary. When the infant is very young, the use of leeches is a measure requiring great caution. If much tenesmus be present, with blood mixed in the stools, as occurs when the large intestines are engaged, more immediate relief will ensue from the application of leeches to the anus, than in any other situation.

The employment of fomentations and baths constitutes a principal part of the treatment; and they are never to be omitted. When the child is feeble we may rest satisfied with the former; but they should be assiduously employed. When able to bear a tepid bath, nothing gives more effectual relief than immersing the child in one up to the ribs, and keeping it in the bath for half an hour or longer. Some have advised cold applications to the abdomen, when the heat is very intense and the fever runs high; and the effect of evaporating lotions, in such cases, is spoken highly of. Stimulating liniments and blisters are most available after leeching and fomenting have been employed; when the acute symptoms have subsided, or any disposition is shown to relapse. Martinet extols the effects of sinapisms applied to one of the extremities for a quarter of an hour, or twenty minutes, several times in the day. We would not venture to continue the application of mustard or turpentine so long at a time; but when used for a few minutes, until smarting is produced, much good is often done. Opium, added to the fomentations or liniments employed, is often of signal service in mitigating the severity of the symptoms.

The internal administration of medicines requires judgment and caution. When the stomach is inflamed, nothing will, at times, be borne; and the best plan is, to abstain from attempting to give any thing. This, however, cannot long be practised with the child, which will not survive without sustenance. Some try to meet the difficulty by administering nutritive enemata, containing thin arrow-root, milk, weak broth, &c.: but these are liable to irritate the bowels, and thus defeat their own object. The plan which we have found to answer best is, to withhold every thing for a couple of hours, and then commence with a tea-spoonful of very cold or iced water, lemonade, or gum-water slightly sweetened. The breast milk of a good nurse, mixed with water, will then be borne; and we rely on the continued use of thin mucilage of gum, as the mildest sustenance we can employ. If the local applications already advised be at the same time adopted, the irritability of stomach soon becomes allayed; and the breast milk may then be given occasionally, but in small quantity.

When the bowels are confined, the mode of managing them is a matter of some difficulty. If gastritis be present, no purgative should be given by the mouth; mild laxative enemata alone should be used; but these must be repeated until purgation is effected, as emptying the bowels is important in such cases. Constipation is, at times, a troublesome symptom; but, when present in enteritis, we must recollect the inflammatory state in which it originates, and try to remove this symptom by overcoming its cause, not by the use of active purgatives. Some aperient, however, may be required; and the compound powder of rhubarb, (p. 162,) or the powder of rhubarb and magnesia, with a little calomel, in general, answers best. A laxative enema may follow; but castor oil, though commonly given in such cases, often causes much irritation. The best and safest general rule is, to depend on enemata for opening the bowels; and the injection of warm water simply, or very thin gruel, should be preferred when the frequent use of enemata is required. In some cases, where there was much irritation of the lower tract of the intestinal canal, with needing, bloody stools, or diarrhœa, we have seen a mitigation of all the symptoms speedily follow the use of the warm water injection.

The employment of mercury, in inflammation of the bowels, is as important as in any other form of inflammation; and next to blood-letting holds an important rank. Calomel or hydrargyrum cum cretâ may be given alone, or associated with opium, according as the bowels are confined or loose. In more grown children, the addition of mercurial ointment to the stimulating or narcotic liniments employed, is of much service, and adds to the chance of affecting the mouth, which in severe cases may be desirable; but, even in the youngest children, mercury will exhibit its power of controlling inflammatory action, independently of salivation, though not in so striking a manner as where that can be effected.

When diarrhœa is present, or the bowels irritable, the best form for giving mercury is the hydrargyrum cum cretâ with Dover's powder. Mercury is here used to subdue inflammatory action, not to cure diarrhœa—the mode of employing it in bowel complaints, which we have elsewhere condemned.

Opium is a very important item in the treatment of inflammatory affections of the bowels in children, but caution is required in using it. Leeching, when necessary, should always precede its use; and then the effect of opium is often remarkable in mitigating the severity of the symptoms. Opium given by the mouth helps to allay the irritability of the stomach, and administered in enema affords the speediest relief by lessening the irritation of the bowels; but mitigating these symptoms is doing little, unless at the same time the inflammatory action be subdued. Opium appears, in some instances, to exercise even this power, when used after blood-letting, or in cases where the child is too much reduced to admit of this measure.

Peritoneal inflammation, arising from escape of the contents of the bowels through a perforation in the intestines, caused by ulceration, is liable to occur in the child; but even in such cases recovery has been effected by the administration of opium, and abstinence from purgatives, as suggested by Dr. Hart,* and practised with success by Drs. Graves and Stokes.

If, when employing opium, sleep or stupor be induced, without the symptoms being mitigated; or if the belly become full and tense, with increase of tenderness, when purging has been checked, we must lessen the dose of the opiate, or suspend its use. So in attempting to employ astringents where diarrhœa is severe, or dysenteric symptoms are present, we must be careful not to have too early recourse to their use, and to lay them aside when any accession to the inflammatory symptoms threatens. However, we have found benefit from their use where the irritation or exhaustion from excessive purging was severe, even before the febrile symptoms had disappeared.

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* Dub. Hosp. Reports, vol. v.

To support the strength during the progress of these cases, is a matter of importance, and should not be overlooked. When the more acute symptoms have been subdued, we must administer nutritious food in small quantities, as advised in the treatment of diarrhœa—beginning with a little chicken broth, which may be at first given cold.

When the case has become chronic, our chief reliance must be placed on a careful regulation of diet, with repeated use of counter-irritants applied over the abdomen, and the occasional employment of opiates, when indicated. In protracted cases where the mucous membrane continues in an irritable state, accompanied by diarrhœa or dysenteric symptoms, the employment of the alkalies, astringents, or bitters, as recommended in the treatment of diarrhœa, (p. 251,) must be adopted; or acetate of lead, nitrate of silver, per-sesquinitrate, or muriated tincture of iron, &c. be had recourse to as with adults in such cases. A powder consisting of equal parts of starch, powdered nut galls, and Dover's powder, will be found occasionally to check chronic diarrhœa when every other remedy has failed of effect. Perseverance in the use of those remedies, when judgment is exercised in their selection, may effect recovery, even though there be evidence of intestinal ulceration. Change of air, and warmth applied to the surface, are essential aids in effecting recovery in all protracted cases.

IV.—MESENTERIC DISEASE—(TABES MESENTERICA.)

Inflammation of the intestinal mucous membrane, or ulceration, such as we have noticed in the last section, may give rise to irritation in the mesenteric glands, leading to their enlargement, softening or suppuration, as we observe to occur in other glands from similar causes. Dr. Cheyne, in his Essay on the Bowel Complaints of Children, long since pointed out the occurrence of diseased mesenteric glands in consequence of intestinal irritation; and this view of the subject is that most popular among modern pathologists. We cannot deny, however, that disease of these glands may arise independently of disease of the mucous membrane: though such is not commonly the case. During the progress of tabes mesenterica, however, disease of the mucous membrane seldom fails to arise, especially towards the termination of the case, death generally ensuing in consequence: hence it is of great importance, both as regards the symptoms and treatment of the disease, to try and discriminate between the morbid action going on in the intestinal mucous membrane,—whether as a cause, complication, or consequence,—and that which strictly belongs to the mesenteric glands.

Causes.—Most authors concur in regarding tabes mesenterica as a scrofulous disease; and Dr. Joy (in his article, Tabes Mesenterica—Cyclopædia of Practical Medicine) gives preference to the appellation adopted by Sauvages, *scrofula mesenterica.* Bichat notices the slow progress of the complaint as characteristic of its strumous nature, and doubtless we shall be correct in viewing it in general as such; but we must not forget its frequently inflammatory origin and complications, nor allow our practice to be biassed by this view of the subject to the extent that the older practitioners did.

The mesenteric glands, which are scarcely perceptible at birth, undergo gradual development, until about the period of dentition, when, in common with other parts of the glandular system, they begin actively to enlarge; and accordingly we find that disease of the mesenteric glands makes its appearance about this period. Infants are seldom affected before the eighth month; but from that time to the eighth or tenth year, the disease is liable to occur,—most frequently, perhaps, from the third to the sixth year, or about the seventh, as stated by Gardien. The glands of the mesentery are, according to Meckel and Portal, more subject than any others to tubercular disease; but true tabes mesenterica is not so common a disorder as may be generally thought.

The disease is met with most frequently among the children of the poor, especially such as are of a strumous habit—in fact, all circumstances tending to the production of scrofula, tend also to the production of mesenteric disease. Unwholesome food, in particular, as leading to derangement and disease of the digestive organs, has a direct tendency to cause irritation in the glands of the mesentery.

Predisposition to tabes mesenterica is manifested in the general characters that indicate the strumous diathesis, in particular when the digestive organs are prone to become deranged, and the abdomen is unusually prominent. The latter sign is one much regarded, in general; but its value is overrated, if indeed it possesses any, as a sign of predisposition to the disease: for until the mesenteric glands are much enlarged, they cannot add to the size of the abdomen, and this part is naturally more protuberant in the child than in the adult. Guersent expressly declares his dissent from the popular opinion, as he did not find children with a large abdomen more prone than others to this disorder, and on the contrary found the mesenteric glands diseased in those who presented no particular protuberance of the belly during life. This fact, all who have examined into the disease must have observed; and, what is more remarkable, enlarged, or even suppurated glands, are found occasionally in the mesentery of children who have died in good condition of body, and had appeared in good health up to the time of their death. Tubercular disease of the mesentery may exist alone, as well as tubercles be found in other situations without any being present in the abdomen; but, most generally, diseased glands are at the same time found in other parts, or well-marked scrofulous disease of some description co-exists with the mesenteric disorder. The most common combination seems to be, with tubercles in the lungs; for even in children, Guersent found only a sixth of those who died in hospital, of mesenteric disease, free from this complication.

Morbid Appearances.—The glands of the mesentery, as we have seen, are capable of taking on increased action, and becoming congested, enlarged, or inflamed, in consequence of the irritation caused by disease of the intestinal mucous membrane. In such cases, the progress of the morbid changes may be traced, by dissection, from an increase in the vascularity of the gland simply, to the deposition of tubercular matter, or the formation of pus. The gland may be found almost natural in appearance, or only a little reddened, enlarged, or perhaps softer to the touch. More commonly, however, it is partly changed into a soft, white, curd-like matter, or this is mixed with pus. These changes may occur without any distinct evidence of the irritation having commenced in the mucous membrane; and, what is not less important to recollect, tubercular matter may be deposited in the gland, or, as often happens, around it, without any appearance of previous inflammatory action, or even increased vascularity of the parts,—the glands being found pale, and not increased in density, even though examined in the first stage of their alteration. Andral is most explicit and decisive on this point. While they remain indolent, the tubercles are firm in consistence, and of a yellowish, or oftener dull white color, and may not be larger than a pea; but as they increase in quantity, they arrive occasionally at considerable size, resembling "a heap of peeled chestnuts," to which they have not inaptly been compared. Tumors of even much larger size may be developed; and in such cases, the tubercular matter not only occupies the place of the entire gland, (which becomes absorbed,) but accumulates around it; and may even be found effused into the laminæ of the mesentery, as stated by Portal.

Symptoms.—The emaciation attendant upon this disease is a striking characteristic, and that from which its denomination, *tabes*, is derived. Tubercles in the mesentery, however, are not necessarily attended by emaciation from the first; for they have been found in cases where the body was not wasted, and therefore their presence not suspected. Even in cases where emaciation has been established, and the glands in the mesentery can be felt enlarged, the wasting is not to be accounted for on the old supposition of actual obstruction to the passage of the chyle, and so wasting of the body from failure of nutrition; for the glands, however enlarged, have not been found impervious to anatomical injections after death; nor, (as Cruikshank remarks,) has "stagnation of the chyle in the first set of lacteals" been met with. The length of time during which mesenteric disease endures, makes also against this supposition; when the patient dies, he perishes from the effects of some acute attack, or of the hectic fever which attends upon this, as well as other forms of tubercular disease. Indeed, emaciation does not become very remarkable, so long as the mesenteric tumors remain indolent; but when once irritated, so as to become soft, and suppurate, hectic fever is set up, and emaciation rapidly ensues. The morbid condition of the digestive organs, so frequently a cause or consequence of mesenteric disease, doubtless contributes to interfere with the process of nutrition; and probably, (as suggested by Dr. Joy,) the morbid condition of the glands themselves must interfere with their share in the process of perfect elaboration of the chyle.

The wasting in tabes mesenterica is marked by its regularity and slowness—that attendant on bowel complaints, is rapid and variable,—the child recovering flesh when the disease is mitigated or subdued.

It is no easy task to assign the symptoms that belong properly to tabes mesenterica, and separate them from those which belong to disorders of the mucous membrane unconnected with mesenteric disease, or which this complaint shares in common with other scrofulous disorders. After a careful review of the symptoms, as set down by systematic writers, and an attempt to verify them by observation, we are disposed to adopt the opinion of Guersent, and confess that the only unequivocal sign of tabes mesenterica is the perception of the enlarged mesenteric glands through the parietes of the abdomen. These we cannot expect to be able to feel, until they are decidedly developed, and the disease has made some progress, so that a degree of doubt must attend all such cases in their incipient stage; yet there is a combination of symptoms which indicates with much probability the existence of the disease. These symptoms we shall enumerate, dwelling on those most to be relied on, and pointing out their relation to treatment, which is not the least important consideration.

For convenience of description, the disease has been divided into three periods or stages—First, the incipient stage, or that in which the enlargement of the glands is present, but has not yet made itself manifest by disturbing the general health, or deranging the digestive organs in any marked manner. Second, a stage of farther advancement, when the glands of the mesentery have become perceptibly enlarged, and the derangement of the digestive organs decidedly marked. This is the period at which the stools are observed to assume the white color which they so frequently exhibit in this disease; and where glands in other parts (particularly the neck) are found enlarged. In the third stage, the mesenteric glands become irritated and suppurate; inflammatory affections of the intestinal mucous membrane are set up; constitutional fever is established; emaciation becomes excessive; and colliquative sweats and diarrhœa close the scene. Such arbitrary divisions cannot be found exactly accordant with nature; but they have been adopted by authors, and are convenient for investigating the disease.

Respecting the premonitory stage we would observe, that though not necessarily giving rise to disorder of the digestive organs, it often arises in connection with such; and whenever mismanaged or scrofulous children have been subject to gastro-intestinal disease, we should be on the alert, and keep attention alive to the state of the mesenteric glands. When we find that such children recover very slowly; are often subject to relapses; that the belly remains full, and grows hard, while the wasting of the flesh continues, (though the appetite be good, or even voracious during the period of convalescence;) we may suspect enlargement of the mesenteric glands, and should look for such. Occasionally the glands may be felt through the parietes of the abdomen, and this is the only satisfactory sign of their enlargement at this early stage.

When tabes mesenterica is established, however, and approaches the second stage, its characters become better marked. At this period, we should find the glands enlarged; and when such are detected, being found hard and knotty in a distended abdomen, no doubt can be entertained as to the nature of the case. The examination will be best made when the patient is fasting. The enlarged mesenteric glands will be felt about the centre of the abdomen, and some slight pain usually attends the examination. This serves to distinguish them from indurated feces, which cause no pain on pressure, and are found lying in the course of the colon, more particularly to the left side. The abdominal pain that attends on mesenteric disease is not increased by pressure; nor does it occur immediately after taking food, being neither accompanied by an inclination to evacuate the bowels, nor relieved when such evacuation takes place. Dr. Joy suggests, in addition, that it is by the concussion imparted by running, leaping, or by hiccup, that most distress will in this case be caused; and Schmalz notices, that the pain is increased by the upright position, by bending of the back, or quick movement, or shaking of the body. The pain is protracted, lasting long, and often recurring about the same hour in the day; or, if absent for a few days, it is renewed with increased severity, as Underwood remarks. In relation to scrofula, it has been noticed that in protracted cases, the pain is most severe in spring and autumn. Authors differ as to the character of the pain. Pemberton says it is lancinating and deep-seated, resembling the pain of gripes, and recurring three or four times a day. Guersent says it is a dull pain, and referred chiefly to the centre of the abdomen. Dr. Young notices its tendency to come out at the back or loins, in which others agree.

The appetite is very variable, often voracious, and a desire exhibited for acid and indigestible food. Fresh meat is not relished; and however nutritiously fed, the child continues to emaciate; while the abdomen enlarges and becomes hard, until it presents a strange contrast with the shrunk limbs, and shrivelled aged-looking face, which are presented in the more advanced stages of the disorder. The derangements of the digestive organs which belong particularly to mesenteric tubercle, independently of inflammatory action of the mucous membrane, are not easily determined, if indeed such exist; but when we find no aggravation of the symptoms induced by the use of stimulating or indigestible food, such as the child often craves for, we may consider that the symptoms depend more on enlargement of the mesenteric glands, than on disease of the digestive organs.

The white, chalky stools, which are often observed during this disorder, have been looked upon as particularly attending tabes mesenterica, and assigned as a symptom belonging to its second stage. This white color has been supposed to arise from the presence of the chyle, which was obstructed in its passage through the lacteal vessels; while others attributed it to the admixture of calcareous matter in the evacuations. The error of the first supposition has been already exposed; and no proof, beyond mere appearance, has been brought forward in favor of the other. White stools, as we have before noticed, attend certain forms of irritation, or inflammation of the intestinal mucous membrane. According to the condition of this membrane, will vary the symptoms as regards the state of the stomach and bowels during the progress of tabes mesenterica; the mucous vomitings, foul discharges, diarrhœa or constipation, acidity and flatulency, which have been assigned as symptoms of the disease, being necessarily connected only with the digestive organs. These are certainly very liable to be deranged, irritated, and even inflamed or ulcerated, during the existence of mesenteric disease; though it has not been shown how tubercles in the mesentery particularly predispose to such conditions, more than the presence of scrofula in general, such affections being most common in scrofulous children.

Worms are not unfrequently present; and when voided, are commonly looked upon as the source of all the symptoms: they are, however, only an accidental combination; though, perhaps, particularly liable to occur from the debilitated state of the digestive organs.

According as the irritation caused by the disease of these organs, or by the enlargement of the mesenteric glands, preponderates, will be observed a difference in the local and constitutional symptoms. In the former case, we shall have more or less of the signs of gastro-enteritis, and the fever will be decidedly of the remittent type; in the latter, the signs of inflammation will be absent, and the fever will assume the hectic character. Sufficient attention has not, perhaps, been paid to this point—the fever being described by some as hectic, by others as remittent; or these terms indiscriminately applied: it is in fact a mixture of both, varying according to the circumstances just pointed out.

When the disease is rapid, or the patient quickly cut off, there are well marked symptoms of remittent fever, and the child dies generally of acute abdominal inflammation; but when tabes mesenterica is slow and protracted, according to its usual course, the fever is a decided hectic,—ending in colliquative sweats and diarrhœa. During the existence of infantile remittent fever, we may apprehend irritation of the mesenteric glands, if the case be protracted, or often renewed, or if it occurs in children recovering from measles, &c.; and the symptoms of the fever then tend to assume the characters of the hectic that accompanies tabes mesenterica. The tendency to chilliness in this complaint is extreme; the least degree of cold is sensibly felt, and the patient hangs constantly over the fire. The skin is harsh, dry and shrivelled—particularly on the extremities, which are often cold; but heat of skin begins towards evening; and as the fever becomes established, morning sweats set in,—which sometimes break out profusely on the head and chest, but may often be averted by keeping awake. The sensorial powers are not much disturbed; but dulness of the faculties, fretfulness, and dislike to all exertion, are manifested. The child generally sleeps well, and delirium seldom or never occurs. The pulse is at first little disturbed, but soon grows permanently quick and hard. Should the enlarged glands become numerous, they may interfere, by their compression, with the functions of surrounding parts, as the liver, stomach, or kidneys; or anasarca may be induced, by obstruction to the flow of blood through the veins.

In the third or last stage of the disordér, when the diseased glands have suppurated, much irritation or inflammation of the neighboring parts usually ensues. The peritoneum may become inflamed, and effusion take place into the abdomen; or, what is more common, inflammation and ulceration of the mucous membrane is established. Pus is occasionally present in the stools; but is not necessarily a sign that the suppurating glands have evacuated their contents into the intestinal canal, as Schmalz seems to assume. Constant diarrhœa now attends, and the child perishes, after having been reduced to the last stage of marasmus.

Diagnosis and Prognosis.—We have already pointed out, with so much exactness, the several symptoms belonging to mesenteric disease, in its different stages and complications, that little remains to be said in addition, under the head diagnosis.

From the liability to complication with tubercle in other parts, particularly in the lungs, we should always examine the chest in tabes mesenterica, to determine whether the hectic symptoms are connected with pulmonary disease or not. Enlargement of the bronchial glands, is the complication next in frequency; but is much more difficult to determine, and may altogether escape detection. The cervical or inguinal glands are often enlarged; and when these show a tendency to inflame and suppurate, at the same time that the mesenteric disease becomes aggravated, and irritation or inflammation of the digestive organs is set up, we have reason to apprehend that softening or suppuration has begun in the enlarged glands of the mesentery, and our prognosis cannot but be unfavorable. This has been assigned as the second stage of the disease, and recovery from it is very rare. When arrived at its full development, or third period, mesenteric disease must be looked upon as hopeless. In the first or incipient stage, especially if the premonitory symptoms be attended to, we may look to treatment with hopes of success; but to be successful, our remedies must be applied with much discrimination.

Treatment.—After the view which has been taken of tabes mesenterica, much need not be said on the subject of treatment,—as this will resolve itself into the means necessary to subdue irritation or inflammatory action, and those calculated to support the constitution, and cause resolution of the enlarged glands. Irritation or inflammation may exist in the mucous membrane of the stomach or bowels, or in the mesenteric glands themselves; and either may give rise to the other. Under these circumstances, we must try and remove the inflammatory action by local depletion, abstinence, or careful regulation of diet; and the use of sedative medicines, as already advised in the treatment of inflammatory affections of the bowels.

In all cases, fomentations, or the warm bath, and frictions over the abdomen, are to be had recourse to. When the irritation has commenced in the mucous membrane, it is important to persevere in the treatment, until this affection is, if possible, completely removed; for even a low degree of intestinal inflammation, if long continued, will cause or keep up irritation in the mesenteric glands, in a subject predisposed to the disease. We must recollect, however, that mere depletion will not remove this condition of the glands, and if leeching be carried too far, the constitution may be enfeebled without the enlargement of the glands being resolved,—particularly if the irritation has commenced in the glands themselves. Neither are we to employ this system too exclusively, as if there were no other sources of the malady, save gastro-intestinal irritation. The whole plan of treatment proposed for the cure or prevention of scrofula, often comes into play; and must be acted upon, when a strumous child is the subject of the disease. We are not, however, at once to fly to tonics or specifics, as the older practitioners did, without regard to the inflammatory origin or complications of the disorder. Of the remedies that have got repute in this way, the fixed alkalies, or their carbonates, would soonest admit of being employed; as when judiciously administered, advantage might be taken of their sedative influence on mucous membranes, as before explained in addition to their known efficacy in aiding the absorption of enlarged glands.

Iodine is the medicine to which we would principally look for effecting the resolution of the enlarged glands, when regarded as a tubercular deposition. Iodine appears to have effected a cure in some well-marked cases; but we must keep in mind the liability of this medicine to irritate the stomach and bowels, and always defer or suspend its internal administration when such irritation is present, or has been induced. The compound solution of iodine (see p. 130) may be employed; but the hydriodate of potash is better, if the bowels are irritable. We generally prescribe it in decoction of sarsaparilla,—beginning with half a grain, or a grain, given in a dessert-spoonful of the decoction, two or three times a day. The addition of a little laudanum, or syrup of white poppy, to each dose, will lessen the liability of the medicine to disagree. Under all circumstances the external use of iodine is admissible, and will always be found beneficial. We may prescribe the ioduretted bath; or the ointment of iodine, or of hydriodate of potash, may be rubbed over the abdomen night and morning; but these ointments are liable to irritate the skin in the child, and this irritation, though not objectionable in itself, will interfere with the continued use of the ointment. Iodine may, however, be employed in this way without any fear of inducing local irritation, by using an ointment of hydriodate of lead—ten or fifteen grains of which are to be mixed with half an ounce of lard.

Mercurial ointment was formerly much used, and may still occasionally be employed with advantage; but the use of mercury should never be pushed so far as to produce salivation, when a decidedly strumous taint is manifested. The occasional use of a mercurial, combined with an aperient when the bowels are costive, or with an opiate when intestinal irritation and derangement of the secretions is present, may always be had recourse to with benefit. Small doses of calomel and antimonial powder, or nitre, when the febrile symptoms run high, and there is furred tongue, thirst, and hot skin, are often of great service at the commencement of the disorder; and in particular, tend to improve the state of the appetite and lessen its voraciousness. If disposed to give mercury to produce any constitutional influence, it should be to act as an alterative; and we would prefer minute doses of corrosive sublimate, as recommended by Sir A. Cooper, and which we have often seen produce a beneficial effect in scrofulous disorders.

Aperients were much relied on of old; and in the commencement of the disease when the bowels are slow, and no intestinal irritation present, they may be employed with advantage. A preference has been given to rhubarb with sal polychrest, as recommended by Fordyce; or with sulphate of potash as more commonly employed. To keep the bowels open, and act mildly on the intestinal mucous membrane, so as to cause some evacuation therefrom, will doubtless be occasionally useful; but to choose this membrane as the surface on which to produce a species of counter-irritation by the agency of purgative medicines, would be, we think, to make a very hazardous selection. Irritation excited on the surface of the abdomen, by means of stimulating liniments, is a more efficient, as well as safer plan, and should never be omitted. Even continued friction by the hand has been found serviceable in exciting the absorbents.

The regulation of the diet is a matter of importance. Some advocate an exclusive use of vegetable and farinaceous food. When inflammatory or febrile symptoms are present, the diet should, undoubtedly, be so restricted; but the continued use of food of this description, in more grown children, is objectionable, as being calculated to debilitate the digestive organs, and generate flatulency, acidity, &c. Portal goes so far as to suppose that such food is even capable of promoting mesenteric disease, by causing a congested state of the glands, in consequence of the circulation in the abdomen being obstructed by the distension of the viscera, thus produced. Some animal food, as broths, &c., will be required to promote digestion, and support the strength; but wine, or fermented liquors, must be given with great caution. In protracted cases, change of air, with sea-bathing during convalescence, and all means by which the strength can be supported, without the digestive organs being over stimulated, must be had recourse to.

As to direct tonics, the moderate use of bitters and chalybeates are among the best; but the preparations of iodine, or its combination with iron, are for obvious reasons to be preferred, when such medicines are admissible.

In extreme cases, we can only palliate symptoms, trying to check diarrhœa, moderate the colliquative sweats, and allay pain, principally by the use of opiates.

V.—WORMS.

Children appear to be more subject to intestinal worms, than grown people, but are by no means so subject to them as is popularly supposed; nor do worms, of themselves, produce the many distressing symptoms commonly attributed to them. It has been said that worms never appear in children while at the breast; but this observation, although generally true, is not absolutely so, as some few exceptions have been observed.

Causes.—Weakly, ill-fed children, living in low situations, of a strumous habit, and such as are subject to disorder of the bowels, are oftenest afflicted with worms. In general, all co-existing disorders are attributed to the worms, if any are present; but they may exist in healthy children, and produce no distress,—their presence not being suspected until they are passed by stool, or discovered after death. Some attribute the origin of worms to inflammatory affections of the bowels; but they are connected with such, only so far as these disorders, by inducing debility of the digestive organs, may predispose to the presence of the worms. Others, again, think that worms may cause inflammation or ulceration of the intestines, and thus, by penetrating their coats, give rise to peritoneal inflammation and death; but no such consequences necessarily attend the presence of worms. They may exist at the same time with intestinal inflammation or ulceration, as these affections are common in strumous, unhealthy children, such as are most subject to worms; and should the bowels be perforated by ulceration, the long round worm, if present, will often creep through, and be found in the peritoneal cavity: but this is a consequence, not cause, of the perforation.

Worms are generally found imbedded in mucus, and a superabundance of viscid mucus in the bowels constantly accompanies their presence, and is even looked upon as promoting their formation. Worms, however, have been found abundantly where the mucous membrane was dry, from want of mucus; and, according to the statement of Andral, we cannot look upon them as necessarily causing any morbid change in this membrane, as it was as often pale as red, in situations where worms were in contact with it.

The protracted use of innutritious or farinaceous diet, with little or no animal food, and insufficiency of table salt, or other condiments, has been assigned as a cause of worms, and apparently with good reason. It is remarkable, that while children are so subject to worms, infants at the breast are seldom affected with them. Summer and autumn appear to be the seasons during which worms most prevail.

Symptoms.—Much as is talked about the symptoms of worms, and often as we hear of worm fevers, &c., there are in fact no symptoms that truly belong to worms; nor is there any such disease as worm fever. The existence of worms can be unequivocally demonstrated only by their having been seen. This subject should now be well understood—at least, it is correctly explained in modern works on medicine: yet popular prejudice seems to be as inveterate as ever; and even medical men are not always exempt from error on the subject. The symptoms which are popularly regarded as indicating the presence of worms, are in truth only evidence of irritation of the mucous membrane of the intestinal canal; and this irritation may arise from other causes, as the presence of indigestible matter, unhealthy secretions, or the existence of a morbid condition of the membrane itself. Indeed, the latter would seem necessary in many instances for the production of any symptoms, although worms were present; as they have been passed by children in perfect health, who experienced no inconvenience on their account. Even the evacuation of worms does not prove that the symptoms present were caused by them, though doubtless they are likely to have been aggravated thereby: but we must not overlook the fact, that the worms may have been but an accidental accompaniment,—a morbid condition of the mucous membrane being the true source of the symptoms. Hence, the passage of a worm is no reason for blindly persevering in the use of anthelmintic medicines; or pronouncing the case cured, because worms were evacuated. It appears, then, that all the symptoms commonly attributed to worms may exist independently of their presence, and that we cannot be absolutely certain of their existence until they have been seen: yet there are a group of symptoms which pretty certainly indicate their presence, and which, when met with together, should awaken our suspicions, and direct attention to the subject. These symptoms may be divided into those depending directly on the presence of the worms in the alimentary canal, and those connected with the sympathetic relations of the digestive organs, and arising symptomatically therefrom. Some difference in the symptoms will also be observed according to the species of worm present, or its position in the intestinal tube. Worms which are situated in the stomach, or upper tract of the alimentary canal, generally cause more severe symptoms, particularly of the sympathetic kind, than those which are situated lower down.

We do not mean here to give any general account of the various species of worms, nor of the numerous symptoms which have been attributed to them; but shall rest content with a notice of the varieties most commonly met with in children, and a statement of the symptoms which more particularly characterise their presence.

Worms may be suspected to be present, when a child looks pale, and grows emaciated, while his belly swells and becomes hard,—a gnawing, pungent, or twisting pain, being felt in the stomach, or about the umbilicus. The appetite is usually precarious, at times voracious; the breath is fetid; and the bowels often deranged, being alternately purged or costive, and much mucus passed in the stools. There is commonly picking of the nose; or irritation is felt in the rectum: and when a child is old enough, he may at times complain of a sense of sinking or faintness, which appears to attend particularly on the irritation caused by worms. When such symptoms are present, and cannot be accounted for by the existence of disease of the mucous membrane, or of the mesenteric glands, we have good reason for conjecturing that worms are their cause.

The sympathetic disturbances are not less remarkable than these more direct symptoms. Symptomatic affections of the head, are among the most serious of those, and the most frequently met with in children. Their sleep becomes unquiet; they are subject to start, or suddenly to awaken from slumber; grinding of the teeth is a symptom often observed; the eye may look fixed or wild; the pupils are often dilated; there is listlessness, restlessness, or great depression of spirits; pain may be complained of in the head, or convulsions attend; but all these symptoms will often at once disappear on the evacuation of some worms; and such we may consider to have caused them, when we observe that the symptoms are not continuous as in hydrocephalus, nor yet so intense as in that disease. Worms may, however, co-exist with it; or the sympathetic irritation caused by them, pass into inflammatory action. When the child experiences a heavy or dull sensation in the occiput, while at the same time, pains in the lower or middle regions of the abdomen are complained of, we have a combination of symptoms which in a particular manner indicates the presence of worms. The respiratory organs are often symptomatically deranged. The breathing may be hurried, oppressed, or difficult. The pulse is quickened, or palpitations induced; and the cough, which so often attends, is in general dry, and of a convulsive or suffocating kind. We discover no marks of lesion in the lungs, on exploring the chest; and this gives additional confidence in regarding the symptoms as dependent on worms. Vomiting, hiccup, diarrhœa, tenesmus, and bloody stools, often accompany their presence.

As to the *varieties* of worms we notice first the *Ascaris Lumbricoides*, or long round worm, which is often met with in children, and resides in the small intestines, particularly in the ileum; but it is liable to make its way into the stomach or bowels, and may be ejected by vomiting, as well as passed by stool. The lumbricoides* may be present without producing any distress, and many of them usually exist together; or they may be found in the same child with the small thread or maw worm. The round worm, when it gives rise to symptoms, is in particular liable to cause sharp, colicy pains about the navel, and a distressing sense of faintness; also, great emaciation and voracious appetite.

There are two varieties of *thread worm*, the long and short; and to these, children in particular are subject.

The long thread worm, or *Tricocephalus*, is about two inches in length, of a white color, and like a thread, whence its name. This is very commonly met with in sickly children, and inhabits the large intestines, particularly the cœcum. This worm occurs in great numbers, but does not often seem to cause distress; nor is it attended with peculiarities of symptoms.

The small thread worm—*Ascaris Vermicularis*—is very common in young children; and also resides in the large intestines, but principally in the rectum. They are called commonly ascarides, and may often be seen in great numbers in the stools, looking like bits of cut thread; and, if recently voided, are usually found in rapid motion. Hence their name *Ascarides;* and hence also, in all probability, the great distress which they produce, compared with the variety last mentioned. They often creep from the rectum in children affected with them, and may be found in the bed-clothes; or seen clustering round the anus, on separating the nates. The itching and irritation felt in the rectum, is a characteristic sign of their presence—this sometimes amounts to actual pain; or they may cause tumors about the anus.

Great sympathetic irritation often attends the presence of these worms; and this is remarkably manifested at the opposite extremity of the digestive tube,—picking of the nose or mouth being a constant symptom of their presence. The stomach is also liable to be affected sympathetically; for when ascarides cause irritation in the rectum, a sickening or gnawing pain is often complained of in the stomach; and hence, most probably, the term *maw worm*, by which ascarides are sometimes called. The sense of sinking, or faintness, before pointed out as often caused by the lumbricoides, also accompanies the presence of ascarides in the rectum, when attended by much irritation; but the existence of this irritation serves to determine which kind of worm is present.

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* This worm is commonly called lumbricus, but erroneously,—this term having been applied by Linnæus to the earth worm.

Other species of worms, as the *tænia* or tape worm, may occur, but those which we have enumerated are the varieties commonly met with in children, and to these, therefore, we have confined our attention.

Diagnosis and Prognosis.—To distinguish between the symptoms of intestinal irritation arising from the presence of worms, and from other causes, is important; and when other causes cannot be detected, we may presume that they originate in worms, and try to remove these. Worms when present, need not give rise to the apprehensions that were entertained concerning them of old; for though fatal consequences have arisen from them in very young children, such a result is rare. Much of the danger formerly connected with worms, arose from errors in practice, the sources of which we have pointed out, and which need not now be fallen into.

Treatment.—Little need be said respecting the treatment of worms in the child, as this does not differ in principle from the treatment adopted with adults. Our first object should be, to determine how far the symptoms present are connected with worms, or may be caused by any inflammatory affection of the intestinal canal. When inflammatory symptoms exist, these must be subdued, before we have recourse to the exhibition of any irritating substance to expel worms, even though we have proof of their presence. We must be guided, therefore, in our treatment, by the condition of the digestive organs, and avoid injuring them by the injudicious use of anthelmintics; which are generally medicines of a very irritating class. Many medicines have been proposed as anthelmintics; but those only deserve the name, which exercise a deleterious action directly upon the worms themselves. Of these substances, some appear to possess special influence over one species of worms more than another.

Purgatives.—Any medicine which acts energetically upon the bowels, particularly if it tends to remove accumulations of mucus, is calculated to expel worms; and hence, most drastic purgatives have been in repute as anthelmintics. When we suspect the presence of worms, and that the state of the digestive organs admits of the administration of such medicines, the best we can employ is a combination of scammony, jalap, and calomel,* to which some strong-smelling oil, as oil of juniper, may be added as an aromatic. This compound has an extensive range of action through the alimentary canal, and is calculated to remove mucus, and act as a brisk cathartic. Hence, when worms are present, it seldom fails to cause the expulsion of some, if judiciously persevered in; and we are thus enabled to judge of the species present, and to adopt our measures accordingly.

When the small ascarides are present, aloes in particular is preferred, from its reputed action on the rectum. In this case, whatever medicines we employ may be given with advantage in the form of injection. Half a drachm, or a drachm of tincture of aloes, may be added to a purgative enema; and the effect will be enhanced by the addition of double that quantity of spirits of turpentine, or some muriate of soda. As ascarides are not always confined to the rectum, aloes may be given by the mouth, as well as by injection.

In employing purgatives, a principal use is to remove the mucous accumulations which form the nidus of the worms, and thus to expose those which have not been expelled, more effectually to the action of anthelmintic medicines. If purgatives be employed too often, or too long continued, they will cause the evil which we wish them to counteract; and, by irritating the bowels, increase the secretion of mucus, and debilitate the digestive organs. A purgative, however, is generally necessary, after the employment of anthelmintic medicines, to carry off the worms which they may have destroyed.

Anthelmintics.—Of the numerous anthelmintics in use, turpentine and cowhage are those which we would in particular recommend for administration to children. Turpentine acts against all the varieties of worms, and may be safely given, even to very young children, in doses of half a drachm, or a drachm, and is most easily taken when administered in milk. Castor oil may follow as a purgative; and this is a better way of giving it, than combining both together. The *dolichos pruriens* or cowhage, is particularly serviceable in expelling the lumbricoides and long thread worm. The worms generally begin to appear after the second or third dose of the medicine; and may then be removed by the aid of a purgative, often in great numbers. The medicine is prepared by dipping the ripe pods in syrup, into which the pubes or hairs are scraped, until it becomes as thick as honey; and from one to two teaspoonfuls are given, while the child is fasting. If care be taken to have the hairs well blended in the syrup, and not allow the lips to be spattered by the medicine, no apprehension need be entertained in giving cowhage to the youngest child; for though so irritating to the skin, and offensive to the worms, it produces no effect on the mucous membrane. This advantage it shares in common with turpentine; and the latter is even highly advantageous in the mucous diarrhœa which often accompanies worms in children.

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* Calomel seems to possess some special power as an anthelmintic; and either alone, or in combination, may be occasionally given with advantage in the treatment of worms We should bear in mind, that calomel enters largely into most of the popular worm-powders, and can thus easily understand the destructive effects caused by these nostrums when ignorantly administered to children.

Various bitters have been given as anthelmintics, and such medicines prove beneficial by restoring the tone of the stomach and bowels; for by invigorating these, worms are often expelled, and their generation prevented. The latter object we should never forget. It will not be enough to remove worms, unless we take means to restore the general health, and improve the digestive powers, in children predisposed to their formation. For this purpose, change of place, or residence in a dry, airy situation, is essential.

The food should be nutritious, or even occasionally stimulant, salt being very freely taken at meals. Even as a medicine, muriate of soda, whether given by the mouth or by injection, is an excellent anthelmintic.

Diluted muriatic acid has in particular been recommended, for restoring the tone of the stomach, and preventing the return of worms. For this purpose, however, we rely more on the use of chalybeates; and we have a combination of both in the muriated tincture of iron—a preparation which we have found very serviceable. Injections of sulphate of iron (from two to five grains in four or six ounces of cold water, for a child) we have found particularly successful in removing ascarides from the rectum; and this remedy, though long since recommended, is now seldom used. The following electuary, which contains iron, is given with great success at the Institution for the diseases of Children, in most varieties of intestinal worms. It in general purges briskly, and seldom fails to carry away worms, if any be present.

No. 45.

Electuar. Anthelmint.

℞ Pulveris Jalapæ
Cryst. Tartari
Carbonatis Ferri â. â. ℥i
Pulv. Zingiberis ʒss
Theriacæ q. s.
Ut ft. Electuarium.
ʒss—ʒi bis terve indies. M.

VI.—REMITTENT FEVER.

In classing the infantile remittent fever among affections of the digestive organs, we declare sufficiently our opinion of its origin and nature: but the disease is in itself very variable; and according to the circumstances which have given rise to it, and the condition of the child in whom it occurs, great differences will be observed in its course and symptoms. Whatever these differences may be, however, we fully concur with those who regard this disease as symptomatic of derangement of the digestive organs; for, as Sir Henry Marsh has long since observed,* "its characteristic symptoms, if closely analysed, will be found all of them to point to the mucous surface as the original seat of morbid action." The nature of this morbid action, however, has not been precisely determined, nor can we suppose it to be the same in all cases: the most general manner in which we can give it expression is by saying, that the intestinal mucous membrane is in a state of irritation. It may also be inflamed or ulcerated; but this is by no means a constant condition, as some would represent; and in many instances, these morbid alterations arise during the progress of the complaint, or even after convalescence has commenced (as happens in continued fever), and must therefore be looked upon as a complication, not a cause.

We have already noticed the tendency which febrile symptoms have to assume the remittent type in the child, no matter what be the lesion of which they are symptomatic; but this is particularly remarkable in gastro-intestinal disease. Some authors, indeed, speak of remittent fevers as being always gastric; and all agree that fevers occurring in nervous and feeble subjects (such as infants are acknowledged to be), show a particular tendency to nightly exacerbations, or to assume the remittent type. We have already spoken so fully of disorders of the digestive organs in the child, that we feel called upon here to curtail much that might otherwise require to have been said, both as to the symptoms and treatment of remittent fever, although no disease of childhood is of such frequent occurrence, more precarious in its progress, or often less amenable to treatment.

The symptoms of remittent fever may be seen distinctly marked, after an infant is one year old, but seldom earlier; and they continue to present themselves in children, until the tenth or twelfth year.

The duration of the disease is variable, and at all times liable to be protracted; most commonly it lasts from one to three weeks, but it may continue for two or three months, and a low form of the complaint, not unfrequently met with, seldom disappears before the fourth week.

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* Dub. Hospital Reports, Vol. III. p. 316.

Causes.—The direct relation subsisting between the symptoms of remittent fever and irritation of the gastro-intestinal surface, is sufficiently manifested by the rapidity with which the symptoms are at times set up, after the ingestion of overabundant or unwholesome food. Generally, a period of indisposition of a few days' duration precedes the full establishment of the fever, which then often sets in with much severity—but we have seen it otherwise; and in one remarkable case, where a foreign body (a marble) had been swallowed by a child in full health, violent symptoms of fever set in almost immediately, assumed the remittent form, and lasted for a few days, until the source of irritation was removed, when they as suddenly disappeared on the expulsion of the marble. It is thus that purgatives prove beneficial, or hurtful, in this disease. When the symptoms are caused by an over-loaded state of the bowels, or the presence of vitiated and inordinate secretions, the exhibition of purgatives, by unloading the bowels and altering the secretions, is at once necessary and useful. Their protracted employment, however, or exhibition in cases where the irritation, existing in the mucous membrane itself, amounts to a high degree or approaches to inflammatory action, must obviously be injurious—as the experience of every day proves, when we see remittent fever brought on or kept up by the abuse of purgatives.

The morbid condition of the bowels which gives rise to remittent fever may be induced by other causes, besides the use of improper food (though this is its most common source); and accordingly we find impressions of cold; variations of temperature, or the effects of season, and other causes inducing this complaint; which indeed appears at times to spread epidemically, and has by some been looked upon as being occasionally contagious.

We must keep in mind the likelihood there is of meeting with remittent fever during the progress of any protracted disorder in the child (as hooping cough) and particularly during convalescence from the exanthemata. This obviously arises from the proneness of the intestinal mucous membrane to take on morbid action under these circumstances; which may be, not a little, promoted by the abuse of purgatives so common in the treatment of children's complaints.

The sudden suppression of a recent eruptive disease, or the quick removal of a chronic one, is often followed by the symptoms of remittent fever. The more delicate a child is, particularly if of a strumous habit, the more liable is remittent fever to occur, and of course, the greater risk is there in the disease when established.

Symptoms.—Premonitory symptoms are usually present in this disease, and may last for several days. The child looks ill, and loses his color; he is languid or fretful; complains of pain in the head or belly, is drowsy, but rests badly, starting in his sleep, or grinding his teeth. Derangement of the digestive organs early presents itself, and is remarkable. The appetite fails, the tongue becomes loaded, and the breath offensive. There is thirst, and frequent picking of the nose or lips. The bowels are always irregular, often confined; but occasionally diarrhœa attends in the first instance. The stools are unnatural, and very offensive; there is much flatulency; and all the secretions are deranged, especially those of the liver. The urine looks milky soon after it is passed, and deposits a sediment.

Fever now sets in: or the attack may commence with high febrile symptoms, and be ushered in by a cold fit; nausea and vomiting not unfrequently occurring. When once established, the fever is remarkable for the distinctness of the exacerbations; the number of which during the twenty-four hours, varies, however, in different cases. There may be, and in general is, but one well marked exacerbation, occurring in the evening, and which lasts till morning, being followed by a profuse sweat. The perspiration succeeding to these exacerbations, however, is not always profuse, and often only partial, being confined to the head or chest; in no instance is it critical. In some instances, several exacerbations are to be noticed in the twenty-four hours. There are often three, distinctly marked—one in the morning, one in the afternoon, and another at night; the latter is generally the severest, and that which lasts longest. When the febrile symptoms run high, the remissions become scarcely perceptible. "It is a singular fact," as stated by Dr. Mason Good, and what we have ourselves observed, "that if the exacerbation or increase of fever take place in the night, there is wakefulness and perpetual jactitation; if in the day-time, drowsiness and stupor."

However cool or lively the child may be at other periods of the day, it always becomes fretful, hot, and heavy, as the exacerbation approaches, which usually commences in the afternoon, the child being comparatively free from fever in the morning. Occasionally, however, the access of fever occurs in the morning, when the child is hot, heavy, or stupid, but grows livelier as the day advances.

During the access of fever, all the symptoms become aggravated; and any inflammatory affections which may be present, as inflammation of the eyes, skin, &c., also undergo exacerbation; the conjunctiva becoming increased in vascularity, or the eruptions greatly heightened in color at this time. The skin, which is, all through, dry, now grows very hot, particularly in the palms of the hands, and over the abdomen; parts that are always hotter than the rest of the body, especially the latter, which is described as being at times burning hot. The pulse rises considerably during the exacerbation, often to the amount of thirty or forty beats in the minute above what it had ranged before. The respiration is also accelerated, and the breathing hurried; the cough which usually attends the disease becomes more troublesome; and there are occasional palpitations. The child is drowsy, and dozes, but does not sleep soundly; for he often moans or talks incoherently, starting in his sleep, or screaming out. There is intense thirst, often incessant, the child calling for cold water or sour milk; but if a large draught be taken at once, pain in the bowels is liable to be induced. There is no desire for solid food; and, if forced upon the child, it is frequently rejected by vomiting.

As the period of remission approaches, a perspiration, for the most part partial, usually breaks out. During the remission, all the symptoms subside, but none actually disappear. The child becomes more lively, and wishes to leave the bed; or, if sleep should occur at this time, it is more natural and refreshing; but the skin still continues dry, though perhaps cool; and the pulse, though lessened in frequency, is still very quick. As the fever declines, the intermissions become lengthened; while the exacerbations diminish in duration, as well as intensity.

Remittent fever is often less distinctly formed, being milder in its symptoms; but it may be very protracted and variable in its course. The child continues ill, appearing alternately better and worse; it looks pale; its flesh becomes soft, its limbs wasted, and there is a great disinclination to move or walk—even pain in the limbs may be complained of on the slightest exertion. The skin is hot and dry, particularly the hands and belly; but the feet are often inclined to become cold. The abdomen is full and tympanitic, or may be hard, and even tender to the touch. The tongue is at first furred and white, becoming red at the edges, and soon grows dry towards the tip, where a parched spot of a triangular shape may often be observed, as Dr. Mackintosh has noticed. The bowels are always much out of order; generally at first confined, but with occasional attacks of diarrhœa. The stools are very unnatural and offensive, being of a dark brown or red color, or even blueish, particularly when the bowels are costive. When diarrhœa attends, the stools are often very white, or green, and are always slimy or charged with mucus. At times there is much tenesmus or only a little mucus mixed with blood is passed.

The urine may be of an orange color; and it has been remarked, that what is passed in the morning deposits a sediment, while that passed during the day exhibits only a cloudy appearance. As the fever declines, and the skin grows moist, the urine deposits a copious sediment, over which it appears, itself, of a straw color. The most remarkable character of the urine, however, and that which is oftenest noticed in sick children, is the white color which it so frequently presents. The urine may appear white, or turbid, as it is passed; but more generally becomes so on standing, when a copious white precipitate is let fall. This is particularly conspicuous, if the child happens to wet the floor, or a table, when, on the place drying, a white crust or coating is seen left behind. This white deposit is ascribed to a preponderance of the phosphates; and this white or phosphatic urine is to be looked on as a serious symptom, indicating a broken-down state of constitution, such as we find in ill-fed, sickly children, especially those of a strumous habit, and who are suffering under disorder of the digestive organs. The white appearance of the urine is usually assigned as a symptom belonging to worms or to tabes mesenterica: but we did not account it such, as it occurs alike in many infantile complaints, particularly in remittent fever; and belongs to worms, or mesenteric disease, only in so far as they are connected with intestinal irritation, or the existence of scrofula.

Occasionally there is absence of thirst, as well as loss of appetite; so that the child cannot be got to take either food or drink, but lies listless, fretful, or drowsy, and appears annoyed at being disturbed.

Dr. Butter speaks of a variety of the disease, of this description, which he calls the low infantile remittent; but which obviously presents that form of the complaint in which there is serious abdominal disease, with the head symptomatically engaged. We not unfrequently see a child in whom symptoms of remittent fever set in with much severity, but with no peculiarity, except that the cerebral functions become very early disturbed. The fever, however, soon subsides, and the child appears to sink,—lying immovable in bed, indifferent to surrounding objects, hardly replying when spoken to, and asking for nothing. The disturbance of the nervous system is exhibited by frequent tossing of the upper extremities during the remissions, though the lower extremities and trunk generally remain fixed; but in the exacerbation, the child slumbers much, yet on being roused is sensible. The condition of the digestive organs is exhibited by the state of the tongue, mouth, and lips, which are covered with sordes; while there is frequent picking of all parts of the face. The urine or stools may pass involuntarily: the latter are very unnatural in appearance; and much pain seems to precede their escape, or that of flatus, much of which is usually present. The countenance indicates distress.—Such is a picture of this variety of the complaint; and in it we recognize the symptoms of a severe enteritic affection, in which the head is engaged.

Diagnosis.—No organ is more liable to become engaged in the progress of infantile remittent fever, than the head; and the diagnosis between hydrocephalus and remittent fever is often so difficult, that some consider it cannot in many instances be made out, until the symptoms of hydrocephalus are so unequivocal as to leave little benefit to be derived from the discovery. This subject will more properly be discussed under affections of the head: but if we keep in mind the nature of remittent fever, and recollect how likely we are to meet with those sympathetic disturbances of the brain already pointed out, as frequently attendant on gastro-intestinal disease, we shall be early on our guard; and by meeting the symptoms of cerebral disturbance as they arise, while we still continue to treat the intestinal disease as their origin, we shall be in many instances successful, and in most cases escape forming an erroneous opinion. It is in the protracted remittent fever of scrofulous children, in particular, that we are to apprehend the supervention of hydrocephalus. Gölis goes so far as to say that such a termination occurs in those cases, six times out of seven.

The sympathetic affections of the chest may, in like manner, terminate in inflammatory disease, if not early met by adequate treatment; but attention must still be paid to the primary disorder, which often appears to be much mitigated on the supervention of the sympathetic disease.

Various eruptive complaints may appear on the skin; and in some instances, pustular eruptions seem to occur in connection with inflammation and ulceration of the intestinal glands. The mouth, nose, or face, are frequently made sore from being *picked.* In these cases, the affection of the skin claims little attention, in comparison with that of the stomach and bowels.

Worms may be present in remittent fever, and give rise to many of the symptoms; but if these persist after worms have ceased to be expelled, we must treat the case independently of this complication. Enlargement of the mesenteric glands is liable to arise, if the case be severe or protracted, and this must be borne in mind; for it is more the complications than the disease itself, that give rise to danger in remittent fever. In addition to the affections of the intestinal mucous membrane, peritoneal inflammation and effusion occur occasionally towards the termination of the case, the child becoming affected with ascites, or dying anasarcous.

Prognosis.—When the exacerbations in remittent fever become almost incessant, as well as violent, and the abdomen swells, while the sympathetic affections increase in severity, great danger is to be apprehended. On the contrary, when the remissions become lengthened, the appetite restored, and the evacuations improved, returning health is to be expected; and this may be looked upon as near at hand, when the sleep becomes natural and refreshing, the pulse falls, the sediment in the urine diminishes, and a general moisture is established on the surface. The pulse, however, will often continue quick, long after the other symptoms have subsided; and we must never lose sight of the dangers of relapse.

Treatment.—The principles upon which we conduct the treatment of infantile remittent fever must be sufficiently obvious from the view which we have taken of the complaint; the particulars must vary according to the condition of the patient, and the period at which we see the disease. In a very recent case, obviously induced by an indigestible meal, an emetic is often of great service. In a similar manner are purgatives necessary, when an overloaded state of the bowels is present. We have already alluded to their value, and the cautions requisite when administering them, (see p. 283.) From the deranged state of the secretions, the occasional use of a mercurial is often very beneficial; and it may be given combined with an aperient, or a diaphoretic, according to the circumstances. The powder of jalap, simple or compound, is that which we usually prefer; and the addition of some ipecacuanha (as recommended at p. 164) increases the effect. When much permanent heat of skin, thirst, and restlessness, are present, one or two grains of James's powder, joined with calomel, or given alone, will best answer to lessen the febrile action. Dr. Cheyne recommends this practice, particularly when the sensorial functions are engaged; and we are thence led to apprehend the occurrence of hydrocephalus. This termination of infantile fevers, Dr. Cheyne thinks, would be less frequent, if bleeding were more practised at the commencement of such attacks. Without limiting the value of the practice to this point, we certainly would advise the use of leeches when the febrile symptoms run high, and the attack is recent, as deserving of more general adoption than is now the habit in treating infantile remittent fever. Leeches should never be omitted, when symptoms of intestinal inflammation are present. These may require to be repeated, and should be so when we find that such symptoms recur during the progress of the case, but we must keep in mind, that increased sensibility of the whole surface sometimes exists in this disease, so that the child cannot bear to be touched in any part; and if the epigastrium alone were pressed, this sensibility might be taken for abdominal tenderness, and inflammation supposed to be present, when such was not the case. After the abstraction of blood, a mitigation of the febrile symptoms generally ensues; and any medicines then given will more easily produce their effects. In particular, mild purgatives will act freely, which had previously failed to have any effect.

The power of the digestive organs upon the food appears often to be quite lost during remittent fever,—that swallowed being either soon thrown up, quite unchanged; or passed through the bowels after some time in a putrid mass, as if it had been subjected to heat and moisture, but without having undergone any of the process of digestion, as Pemberton has distinctly noticed. Such masses may lie in the intestines, and keep up an irritation which we shall in vain attempt to remove, until this matter is expelled, though the symptoms may be mitigated by the use of leeches, &c. Dr. Mackintosh, in his Practice of Physic, gives a very instructive case of this description, in which leeches, &c., produced only temporary relief until a mass of indigested food was expelled by the agency of some castor oil. Of leeches, then, we may speak as we have of purgatives: though each may be occasionally necessary, neither is to be persevered in as if constituting a cure for this disease. Aperients will, however, be oftener required than leeches.

Refrigerants should never be forgotten in the treatment of remittent fever. To give cold drinks, and keep the body cool by light clothing, and the use of an airy apartment, (while we enjoin quietness, and occasionally exclude the light,) is essential to recovery. We have used nitre freely in this complaint, and have derived signal service from its employment. When the bowels are not irritable, a solution of crystals of tartar, given cold in the form of *imperial*, possesses many advantages, as it acts on the kidneys, while it allays thirst, and tends to keep the bowels open. In the more advanced stages, when debility sets in, we have found the mineral acids useful; they can be employed much sooner than quinine; but the latter may occasionally be prescribed at the close of the complaint.

When much irritability prevails, or diarrhœa is present, the judicious use of Dover's powder will prove very serviceable; and recourse should be had to the soothing influence of fomentations, or the occasional use of the warm bath.

Attention to diet is an important point in the treatment of this disease; and all we have said respecting regulation of diet, under the head of diarrhœa, or inflammatory affections of the bowels, applies here: in particular, we must avoid giving such food as is likely to leave much residue behind; and we must be very cautious in allowing any sudden return to the habitual diet, during convalescence. At this period, change of air is of essential service, and indeed, throughout the whole management of remittent fever, nothing is more remarkable than the benefit derivable from the latter source. We have frequently seen a patient who had been several weeks laboring under the disease, restored to the enjoyment of tranquil and refreshing sleep, the night after his removal to a distance of three or four miles from his ordinary abode.

When diarrhœa is present, it must be treated on the principles already laid down; but in protracted cases, we have found the use of turpentine, in particular, of service; and when this affection becomes chronic, after the febrile symptoms have subsided, we have derived much benefit from using the per-sesqui-nitrate of iron.

CHAPTER X.

DISEASES OF THE RESPIRATORY ORGANS.

THE infant, like the adult, is subject to inflammations in the different portions and tissues of the respiratory apparatus, as well as to some affections of these parts which are rare, or altogether absent in after life. In considering the latter, we shall attempt a complete view of their nature; but with respect to the former, we can only advert to their peculiarities in the young subject, as to character and treatment,—our limits forbidding anything like an extended view of those diseases which are common to both child and adult.

I.—CATARRH, (COLD.)

We have seen that the mucous tissues of children are possessed of considerable irritability, and are subject to sudden alterations in the quantity or quality of their peculiar secretions; and accordingly, as might be expected, simple *Catarrh* or *Coryza* is a frequent ailment throughout the whole period of infancy and childhood. This affection begins with sneezing, watering at the eyes, and discharge of mucus from the nostrils. The latter is at first clear, but subsequently becomes thick, greenish-yellow, and at length puriform. The child's face is flushed; its skin hot. It sleeps with its mouth open, and snuffles in breathing. The latter symptom is often very distressing; and the tumefaction of the Schneiderian membrane* may be so great, as altogether to prevent the passage of air through the nostrils, and so to interfere with sucking, in the young infant. All the symptoms just now narrated, may be but the precursor of some exanthematous disease, as measles or scarlatina, and, holding that in view, we must always be on the watch for the proper eruption. The snuffles may exist as a symptom of syphilis; but we shall then have other indications of that disease, which shall be noticed under the proper head.

Simple catarrh is not dangerous, and requires little treatment. Any cause which may have excited it should be obviated, as draughts of cold air, or (in the very young infant) too much direct light; the child may be placed in a tepid bath, and subsequently kept warm; and it will generally be advisable to administer a gentle aperient, as a little castor oil.

The affection of the membrane of the nostrils may, however, assume a chronic form, and by interrupting the child's sucking, may materially interfere with its thriving, or even ultimately wear it out. The principle of treatment in these cases is, to restore tone to the mucous membrane, by improving the general health; and the most likely means of effecting this will be, change of air and food,—procuring for the infant a healthy nurse; or, if it experiences difficulty in sucking, supplying it abundantly with asses' milk. We should also attend to the surface of its body, and endeavor to promote a healthy condition of it, by sponging once or twice daily with tepid vinegar and water. Gentle alterative aperients, as rhubarb combined with hydrargyrum cum cretâ, and a minute quantity of ipecacuan, will be found serviceable. Billard recommends from two to four grains of calomel to be given, for the purpose of establishing a point of derivation in the intestinal tube; and the application of a small blister to the nape of the neck, or arm. These means we should only resort to when others have failed; and we would recommend a previous trial of iodine, which appears to us to exercise a special tonic power upon mucous surfaces.† As a local application, we have found advantage from the introduction into the nostrils of a bit of lint wet with a decoction of guaiacum wood; but any means of this nature will be badly borne by the young child. Billard describes coryza as sometimes resulting in the exudation of a false membrane upon the nasal passages, which, in the case related by him, produced death, by obstructing the access of air to the lungs. Such a case might require the performance of bronchotomy.

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* The mucous membrane lining the passage of the nostrils.

† See formula No. 10, p. 130.

II.—BRONCHITIS, (BRONCHIAL CATARRH.)

This disease is, as it were, an extension and exaggeration of that last described, being an inflammatory affection of the mucous membrane lining the air cells of the lungs, which is continuous with that spread over the cavities of the mouth and nostrils. Children are very subject to it at every age; and in every degree of its intensity. *The symptoms* are—general fever, and restlessness; with quick pulse; hot skin, and costiveness; or frequently, diarrhœa, with deranged secretions; cough, more or less violent; a mucous râle or wheezing, which may be heard by applying the ear immediately to the chest, or may often be *felt* by placing our hands flat, upon opposite walls of the thorax; respiration frequent (amounting sometimes to 100 in a minute); dilatation of the nares during inspiration, and occasionally, difficulty in the act of sucking: upon percussion, we shall find the chest sonorous throughout, at the commencement; but towards the close it may be dull in some parts; the face may be livid and swollen or pale and œdematous. In the latter stages, each fit of coughing is accompanied by a paroxysm of suffocation, ending often in vomiting; and towards the termination, coma or convulsions may supervene. When the disease terminates unfavorably, it usually runs its course within eight or ten days: when the child is to recover, convalescence generally commences in five or six days; the respiration becomes less frequent, the fever abates, and a free secretion being established from the mucous membrane, the cough becomes looser and less suffocative.

In young children, the expectorated matters are always swallowed: but when we have an opportunity of observing them in older ones, we find that they consist at first of transparent mucus and subsequently of viscid, opake, yellow or greenish, muco-purulent masses.

The anatomical characters are, increased vascularity of the mucous membrane, presence of viscid or purulent mucus in the air cells, and engorgement of the lungs with dark-colored blood. Bronchitis, in children, is frequently complicated with pneumonia; and then we have, as a morbid appearance, hepatisation of the lungs, to a greater or lesser extent, and which we have observed to be most complete in the lower and posterior portion. This combination, or *broncho-pneumonia,* (as it may be termed,) frequently occurs as a complication of measles and hooping-cough, and appears to be identical with the disease described by Dr. Cheyne as "the Epidemic Peripneumony of

Children."* As in the adult, bronchitis may become chronic, and will then closely resemble phthisis.

The *prognosis* depends altogether upon the quantity of inflammation, and of the accompanying fever: in a previously healthy child, the disease is generally under the control of art.

The *treatment* may, in common, be more decidedly antiphlogistic than would be warranted in the adult, (some explanation of which may be found in the fact of bronchitis being so frequently complicated with pneumonia in the child;) and we shall often be obliged to employ general blood-letting by the lancet, or by leeches to the hand or foot. When we see the disease early, an emetic of ipecacuan wine will often quickly cut it short, and will always afford relief by causing a discharge of mucus. The administration, then, of one or two tea-spoonfuls of the medicine just mentioned, every ten or fifteen minutes, until vomiting is produced, is very often our first step; but should the fever and difficulty of breathing be considerable, with hot skin, and the pulse not very feeble, we must at once bleed. From two to four ounces, during the first two years, will commonly be a sufficient bleeding; but it must be carried far enough to make an impression on the system, which in young children we can always judge of by their lips becoming pale. It may be necessary to repeat the bleeding, if the symptoms which called for it at first, should return; but if a suitable quantity of blood be taken in the beginning, this will not often be the case. When the bowels are confined, or the secretions depraved, we must administer an aperient or alterative, as the powder of jalap and ipecacuan, (No. 31, p. 164;) but it is decidedly injurious to carry purging to any considerable extent in the treatment of bronchitis. Indeed, so intimate in children, is the sympathy between the gastric and bronchial mucous membranes, that we have frequently seen all the symptoms of bronchial catarrh kept up, long after the inflammation had ceased, by irritation produced in the intestinal tube by over-purging.

Next to blood-letting, the most powerful means of checking bronchitis is, undoubtedly, tartar emetic; and we shall often find great advantage to result from their combined employment. After the immediate effects of blood-letting have subsided, should the fever and dyspnœa not be materially relieved, we may administer a solution containing from the eighth to the fourth of a grain of tartar emetic (according to the age of the child) every hour, until vomiting or faintness be produced; and by this means we shall often save the system the expense of a second bleeding. In the advanced stages, tartar emetic will frequently fail of producing any effect, and we think had better not be given except in cases indicating, or *almost* indicating blood-letting.

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* Pathology of the Membrane of the Larynx and Bronchia. By J. Cheyne, M. D. Ed. 1809. See also, Observations on the Peripneumonia of Children, by Thomas Cuming, M. D., in Trans. Association K. and Q. Coll. of Physicians, vol. v.

After the employment of tartar emetic, or in conjunction with it, the warm bath will frequently be of decided benefit; but it must be confined to the lower extremities of the child. The pelvis and legs alone must be immersed, by which plan a derivative effect appears to be produced; while the general warm bath excites the circulation, and always does harm. The heat of the water should be from 98° to 100°, and the child should not be left in it longer than ten or fifteen minutes.

When the disease has been neglected at the commencement, or has not been cut short by such active treatment as we have recommended, we often find that considerable debility sets in, at the same time that a profuse secretion is taking place from the mucous membrane. Under such circumstances we must not bleed, as the stage for *arresting* the inflammation has then passed, and strength is required to throw off the secreted matters, and to enable the system to hold out until resolution be accomplished. In this stage we have found advantage from the use of calomel and ipecacuan, in doses of from a sixth to half a grain of each, every second, third, or fourth hour; these medicines often acting without producing any sensible evacuation, although they occasionally cause vomiting and purging. When the bowels are in an irritable state, it will be well to combine a grain of compound-chalk powder with each dose.

It is at this period also that we meet an opportunity for the application of blisters, when the skin is becoming cool, and the system obviously in need of a stimulant; but for reasons explained in a former chapter, we must never allow one to remain on, longer than three or four hours. The best situations for blisters are the front of the chest, and between the shoulders. We have often seen great benefit produced by them when employed at the proper time, and have, in many instances, observed the bronchial symptoms to subside altogether, simultaneously with the setting in of gangrene in the blistered part. In these cases, however, the cure is most commonly purchased by the death of the patient from the new affection.

We have not yet spoken of the use of expectorants. During the early stages, nothing of the kind is admissible, beyond the emetic medicines we have recommended. In the latter part of the stage of debility, however, stimulants will be required, and we may then join them with expectorants, e. g.—the decoction of polygala may be given every three or four hours; and ammonia or squill may be resorted to, according to one of the formulæ at p. 147. When the child is much weakened, white wine whey may be given in quantities of a tea-spoonful every hour or half hour. But when these measures are called for, the time for curing the disease has, in all probability, passed away; and we cannot too explicitly caution the practitioner to meet it promptly and judiciously upon its first approach.

The regimen in the early stages should be antiphlogistic. Infants often suck greedily at the commencement; and Dr. Cheyne recommends the breast to be withheld, and water, or thin gruel sweetened, or mixed with a small quantity of the breast milk, to be given instead. Older children should certainly get nothing but mild fluids, as barley-water or whey, during the early stages. During the progress of convalescence a nutritious diet will be required, but it must be of the lightest and least stimulating kind. Infants will need nothing beyond a plentiful supply of breast milk.

The temperature of the child's apartment should be equable, and moderately warm; but free ventilation should at the same time be secured. In the latter stages change of air, even from one room to another, when it can be accomplished without much exposure, will often do signal service.

III.—PNEUMONIA, (INFLAMMATION OF THE LUNGS.)

We have stated that pneumonia (or inflammation of the substance of the lungs) frequently exists as a complication of bronchitis, and our observations lead us to doubt much if it ever occurs in young children as a primary idiopathic affection. This view may be attributed to the difficulty of recognizing the disease in infancy and childhood, and the insufficiency of the physical signs, at these periods of life, to the establishment of an accurate diagnosis between bronchitis and pneumonia. In cases in which post-mortem examinations disclosed to us unquestionable results of pneumonia, the disease had commenced with the symptoms of bronchitis detailed in the last section. There was mucous, but not crepitant râle, and no distinct bronchial respiration. Any information to be derived from the sputa was, of course, wanting, as children seldom or never expectorate; and percussion commonly gave a dull sound on both sides, the induration seldom being limited to one lung.*

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* Some interesting observations bearing upon this subject occur in a paper, on "The Temperature natural to Man in his Physiological and Pathological condition," read before the Paris Academy of Sciences, by M. Royer. The mean temperature of new-born children, in a state of health, M. R. states to be 37° R., and he concludes from a series of experiments:—1. That the maximum of heat is 42° 50, and the minimum 23° 50; thus the temperature of sick children varies about 19°; whereas, according to M. Auchal, the variation in adults does not exceed seven

According to the observations of Dr. Gerhard,* children above six years of age are subject to pneumonia, with characters precisely similar to those which the disease presents in adults; but, previously to that age, it is very different in symptoms and progress, occurring mostly as a secondary lesion. Of forty cases which he noted in the children's hospital at Paris, of patients between the ages of six and sixteen, exhibiting the true signs and symptoms of pneumonia, but one terminated fatally; while of sixteen patients between two and six, "who seemed attacked with pneumonia," twelve died, and presented a greater or lesser degree of hepatisation of both lungs. Dr. G.'s experience therefore, may be considered as not opposed to our own.

M. Berton expresses similar opinions, considering pneumonia in children to be frequently complicated or secondary; he also particularly mentions the difficulty of its diagnosis by means of the physical signs.†

M. Billard, also, conceives that the pneumonia of infants always arises from a stasis of the blood in the lungs, acting in some sort as a foreign body, and that it possesses characters really different from those of the disease similarly named in adults; but he subsequently states, as an argument against the use of expectorants, that the bronchi frequently take no part in the inflammation.

From the views we have just put forward, it must be obvious that we can have little to add, either with respect to the symptoms or treatment of pneumonia in children, to what we have advanced when treating of bronchitis. If the disease be met with and recognized in young children, as a primary affection, it must be treated upon the principles laid down for the first stage of bronchial inflammation; and a suitable management of that morbid condition will be the best means of preventing the appearance of pneumonia as a lesion secondary to it.‡

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degrees. 2. That whenever the temperature of a child is above thirty-eight degrees, it may be said fever exists. This increase of heat is the surest existence of the febrile state, for in the case of a new-born child the pulsation is frequently as high as from 120 to 140, without there being the slightest fever or any appearance of ill health. 3. The thermometer announces the existence of fever, but it does not indicate its nature. 4. The affections of childhood which produce the maximum of caloric are pneumonia and typhus fever. 5. Typhus fever is the only malady in which a considerable elevation of the temperature may exist with a moderate acceleration of the pulse. 6. If in the case of a child whose respiration and pulsation are notably accelerated, the thermometer should mark 41°, or even 40°, it may be asserted without fear of error that there is pneumonia." We quote from a periodical of the day, not having seen M. Royer's paper. [Note to Fifth Edition.]

* American Journal of Med. Sciences, vol. xiv.—xv. Philadelphia, 1834.

† Traité des Maladies des Enfans. Paris, 1837.

‡ M. M. Rilliet and Barthez observe, that in almost all the cases of pneumonia in children, treated by them, and which terminated favorably, the improvement com-

IV.—PLEURITIS

Is occasionally discovered upon the post-mortem examination of children, but there are no diagnostic marks which distinguish it from other inflammations of the chest during life—"the integrity of the cry" mentioned by M. Billard, being altogether insufficient for diagnosis. This is of the less consequence, however, as the treatment must be similar to that of any other inflammatory affection of the chest. There does not appear to be much tendency to pleuritis in the young subject, as we do not meet with traces of it in their bodies nearly so often as in those of adults.

We may mention here that *Pericarditis* may be shown by morbid appearances to have existed in young children; but as the discovery of it during life, in such patients, can in the present state of our knowledge be only a guess; * and as its treatment must be identical with that of the inflammations we have been just considering, it would be out of place to notice it at greater length.

V.—CROUP.

Cynanche Trachealis, Angina Membranacea.—This disease may be said to be peculiar to childhood, being most common between the first and eighth years, and scarcely ever occurring after puberty. It consists of an inflammation of the mucous membrane of the larynx, trachea, and bronchial tubes, usually ending in the formation of a membranous concretion upon the internal surface of those parts.

The predisposing cause of croup is considered by Dr. Cheyne to be the imperfect state of development of the organs of voice, there being scarcely any perceptible difference between the aperture of the glottis of a child of three and one of twelve years of age; while, after puberty, that opening is suddenly enlarged, in the male, in the proportion of ten to five, and in the female, of seven to five: thus, at least, marking the limit

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menced between the seventh and ninth days, whatever might have been the treatment, or even when no treatment was adopted.—*Maladies des Enfans: affections de Poitrine.* Paris, 1838. [Note to Fourth Edition.]

* A case remarkably corroborative of this statement was related, by Professor Benson, to the Surgical Society of Ireland, during its present session. A child, five months old, died after an illness of eight days, during which period it was treated by three medical men of experience. The illness was chiefly indicated by screaming. On examination, after death, a large quantity of fluid was found within the pericardium; the surface of which and of the heart were coated with a thick layer of lymph; the walls of the left ventricle, when divided, presented an unusual thickness; where the lung lay in contact with the diaphragm there was some lymphy exudation, but there was no pneumonia. See *Medical Press*, vol. iii. p. 28. [Note to Third Edition.]

of the period of occurrence of the affection. There appears to be a remarkable predisposition to the disease in certain families, many children of the same parents being affected with it at different times. It is also observed to be endemic in certain situations, especially in the neighborhood of seaport towns, and about the mouths of large rivers, where the inhabitants are exposed to the effects of a damp, alluvial soil, and moist atmosphere, and at the same time usually suffer the privations incident to a dense state of population.

When a child has been once affected with croup, it must be considered as liable to a recurrence of the disease, at any period until the arrival of puberty. Infants at the breast are less liable to be attacked than those who have been weaned; but Dr. Home has observed that an early weaning renders children more liable to the disease. It may occur at any season of the year, but its most common period is in the end of winter and spring, and during the prevalence of north and north-easterly winds.

Symptoms.—Croup is sometimes preceded, for two or three days, by symptoms of a common catarrh, attended usually with hoarseness and a rough cough. We can never be too early in our recognition of the more dangerous affection,—and accordingly, we should look with suspicion upon the two last-named symptoms, especially when we have reason to dread any predisposition, local or hereditary, to croup. Occasionally there are no premonitory symptoms whatever, the attack taking place during the night, after the child has, perhaps, passed an evening of unusual gaiety, and exercise in the open air.

The approach of the disease may then first be indicated, and alarm excited, by the child giving, during sleep, the unusual cough which is so well known as one of its most characteristic symptoms. It is a single cough, sharp and ringing, as if it passed 'through a brazen trumpet,'—and when once heard and recognized, will not easily be forgotten. When the child awakes, which soon happens, his voice will be observed to be sharp and stridulous; his breathing audible, difficult, and labored, and often accompanied, during inspiration, with a crowing sound. He is obviously suffering great distress; the face is swelled and red; the eyes suffused; the skin hot; pulse quick and hard; if old enough, he complains that he is choking, and eagerly asks for drink; if younger, he tosses about restlessly, and frequently grasps at his throat, as if anxious to remove some obstruction to respiration. The ringing, solitary cough continues at intervals. In a few hours the disease, though unchecked by treatment, may appear to subside, and an interval of comparative ease may ensue. This is, however, commonly but a remission; and if the affection be not cut short in its first stage, the respiration becomes more and more labored and wheezing; the cough hoarser and suffocative; the voice stifled; the countenance pale or livid. The debility of suffocation then sets in—the extremities become cold; the skin clammy; there are dark and fetid stools; insensibility or convulsions supervene; and the patient dies between the third and fifth days. In the latter stages, the child if old enough to expectorate, may cough up puriform matter, and portions of a whitish membranous substance.

In some cases croup may assume a more chronic form, and be protracted for two or three weeks. In others, the fatal event may take place early, in consequence of a spasmodic paroxysm of dyspnœa occurring, and continuing long enough to destroy life by suffocation. During a paroxysm of this description it has been observed that the head will be occasionally thrown back, so as to stretch the trachea, and that such a posture will afford temporary relief.

The auscultatory signs in croup (independent of the peculiar cough, and crowing respiration), indicate inflammation of the air cells, and sometimes of the substance of the lungs. We have at first a mucous, and subsequently a sibilant râle. Upon percussion also, we may have a dull sound throughout a greater or lesser extent of the chest. When the false membrane is partially detached, we may have a clapper or valve-like sound, upon inspiration, when the upper, and upon expiration, when the lower extremity of the membrane is detached, and moved by the passage of the air through the larynx.

The anatomical characters of croup are redness and swelling of the mucous membrane of the larynx, trachea, and bronchi—all of which, especially the two former, may be lined with a yellowish membranous substance, which sometimes assumes a tubular shape, and at others exists in detached portions. This is the *membrane of croup*. But the disease may terminate fatally before its formation, and we shall then find the mucous membrane of the larynx red and swollen, and perhaps covered with a yellowish, viscid fluid. The trachea commonly contains a reddish serum, which is also found in abundance in the air cells and parenchyma of the lungs. Sometimes there is even hepatisation to a considerable extent, and the pleura may share in the inflammation.

These characters explain the course of the disease, in which there is inflammation and effusion, accompanied by difficult and imperfect respiration, and causing a circulation of blood not revivified; loss of sensorial power; and death. The occasional occurrence of a suddenly fatal exacerbation, after a remission of the symptoms, Dr. Cheyne refers to a valve-like closure of the tracheal tube by a portion of the membrane which has been partially detached, and the production thus, of instant suffocation.

Diagnosis.—Other species of cynanche may simulate croup—e. g. cynanche maligna, or (to use a different nomenclature) diphtherite may extend into the upper opening of the larynx, and produce croupy breathing. This disease is to be distinguished from genuine croup by the existence of aphthæ, or sloughs, or of a membranous concretion upon the fauces:—these never exist in the latter affection.* Cynanche pharyngea, or inflammation of the pharynx, may also be distinguished by the inflammation of the fauces, and difficulty of swallowing proper to it. Measles sometimes assume the features of croup upon their first attack; the catarrhal symptoms of that disease occasionally assuming a croupy character. The diagnosis can only be established by the appearance of the characteristic eruption, when it is probable that the doubtful symptoms will subside. Hysteria may occasionally present, as one of its features, the characteristic cough and breathing of croup; but the former disease is not of frequent occurrence before puberty, and the latter seldom appears after that period; so that they are not likely to be confounded.

Every affection of the larynx is subject to exacerbations, which partake much of a spasmodic character; and, as we have already stated, a paroxysm of this nature may occur at an early period of true croup, and destroy the patient before there has been time for any very important results of inflammation to be produced. Similar paroxysms have also been observed without previous or subsequent symptoms of inflammation, and have subsided without active treatment; so giving rise to the notion that there exists a distinct form of *Spasmodic Croup.* There are, however, no means of distinguishing between the two affections, (if two distinct affections exist,) beyond the degree of violence of the symptoms. Whenever, therefore, we meet with the symptoms already enumerated, as indicating the onset of croup, we should be upon the alert; and as soon as any permanent difficulty of breathing sets in, we should forget all hypotheses of the spasmodic nature of the disease, and treat it as an active inflammation, persuading ourselves, like Dr. Kellie, "that there is truly no essential difference between them, (spasmodic and inflammatory croup,) other than what arises from degrees of violence, and the obvious circumstance of intermission and continuance." *

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* [In a paper on the History and Diagnosis of Croup, by Dr. John Ware, (New England Quarterly Jour. of Med. and Surg., 1843,) the author draws the following conclusions, and they will probably be found to agree with the views of those members of the Society who have seen much of the disease.

"1. That the only form of croup, attended with any considerable danger to life, is that which is distinguished by the presence of a false membrane in the air-passages.

"2. That the existence of this membrane in the air-passages is, in a very large proportion of instances, indicated by the existence of a similar membrane in the visible parts of the throat."—*Publishing Committee Mass. Med. Soc.*]

Prognosis.—Croup is always a dangerous disease, even under the most favorable circumstances; but it is also one which admits the use of decisive means, and is thereby remarkably within the control of art. When we see a patient, then, at an early period of the disease, we may hope to be able to relieve him; but still our prognosis should always assume a doubtful tone.

Treatment.—From the view we have taken of the nature of croup, it must be obvious that we are prepared to recommend a strictly antiphlogistic treatment and regimen; and, in truth no other plan can be relied upon throughout the disease. When we find a child affected with the "ringing cough," especially if it belong to a family subject to croup, we should at once place it upon a diminished allowance of non-stimulating food, confine it to the house, and administer a drachm of ipecacuan wine, or of the antimoniated mixture, recommended at p. 143, every hour or two, until nausea be produced; and this we should keep up for ten or twelve hours. We may, at the same time, apply to the throat a flannel bag filled with hot salt, as recommended by Mr. Kirby,† a measure which we have found to act most beneficially as a rubefacient, and by bringing out general perspiration. By adopting these means, we may often anticipate and prevent a seizure of the croup.

Let us now suppose that fever and difficulty of breathing exist, together with the other symptoms denoting that the disease has actually commenced—under these circumstances the first principle to be held in view in our treatment, obviously is to subdue the inflammation, and obviate the tendency, which the mucous membrane of the child possesses, to the production of a membranous concretion. Our most powerful means of working out this principle is bloodletting; and this should be immediately performed by opening a vein in the arm or hand, or, (if we cannot get sufficient blood from these,) the jugular vein. Enough of blood must be taken to produce an effect on the system: under two years of age, from two to five ounces; under the eighth year, from three to eight ounces—will probably do what we require, at least for the time.

Mr. Porter‡ judiciously observes that "it is not sufficient to diminish an increased action, unless the constitution be kept, until the period of danger is over, in a condition that will render a renewal of that action unlikely to occur." Now, the best means of effecting this object is, simultaneously with the bleeding, to place the system under the influence of nauseating medicines; and, accordingly, if we have an emetic at hand, it will be well to give it, shortly before bleeding, so as to cause the abstraction of blood to be made while the state of nausea is commencing. Thus we shall often produce, at a small expense to the constitution, a degree of depression sufficiently complete to overcome the disease; and this must be kept up until the fever, hurried respiration, and other symptoms of danger disappear. To keep up the state of debility, a drachm of the antimoniated mixture, prescribed at p. 143, must be given sufficiently often, (i. e. every half hour, hour, or second hour,) to maintain a continued nausea. While this is being done, the lower extremities of the child may be placed for ten or fifteen minutes, in a warm bath at the temperature of 98° to 100° F. and two or three grains of calomel given every third hour. The calomel we would expect to move the bowels after the second or third dose; and if it then fails to do so, a drachm, or two drachms, of castor oil should be given. Mercury has been recommended as a substitute for blood-letting in the treatment of croup; but it should never be solely trusted to, in the first stage of an acute attack. If the disease be violent, one bleeding will often be sufficient; but whenever reaction takes place, we must have recourse to a second. In severe cases, it may even be necessary, in a strong child, afterwards to apply leeches, to the sternum, (never to the throat, for the reasons specified at p. 135,) always proportioning the depletion to the strength of the child, and to the continued violence of the acute inflammatory symptoms.

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* Letter in Cheyne's Pathology of the Larynx and Bronchia.

† Dub. Med. Jour. vol viii.

‡ Observations on the Surgical Pathology of the Larynx and Trachea. Dublin, 1826.

When the active measures recommended have been judiciously employed in the commencement, we shall often have the satisfaction of finding that the respiration becomes less labored, the cough loose, and that the fever abates; and we then know that our treatment has been, so far, successful. We must still, however, most carefully watch against the dangers of a relapse, strictly enjoining an antiphlogistic regimen, and directing the utmost vigilance towards any return of the symptoms.

When we have been unable to control the disease, or it has run into its second stage before assistance has been obtained, our principle of treatment is somewhat different. We have still an increased vascular action to reduce and modify, but we have also to combat the effects of that action in the production of a false membrane in the larynx and trachea, and of congestion in the lungs and, in the more advanced periods, in the brain. The time for bleeding, therefore, which should be considered rather as a preventive than a cure of inflammation, has passed away; and we must not, by its use, permanently reduce the strength of the patient, when all his resources will be wanting to carry him through a protracted, but natural effort at recovery.

At this period, Dr. Cheyne recommends the continued use of antimonial emetics; and it is from their employment, certainly, that we would hope for most benefit. The emetic may be expected to relieve the respiration, by aiding in the removal of the effused fluid from the bronchial tubes; and the continued nauseating effect of the antimony will offer the best chance of reducing and altering the morbid condition of the diseased parts. Half an ounce of the antimoniated mixture should be given every half hour, until vomiting be produced; and in two or three hours after the last act of vomiting, the same process is to be recommenced, and so repeated while the strength will admit. A remarkable tolerance of the medicine will often be produced, so that several grains of tartar emetic will be taken without causing any effect. The only cases which Dr. Cheyne saw recover from the second stage of croup were those in which the patient was kept under the influence of the medicine for two or three days.

It is in the second stage of croup that calomel may be looked to as likely to produce a useful effect, beyond what depends upon its purgative quality. This medicine appears to possess, in many cases, the effect of equalizing and quieting increased local vascular action; and we may, therefore, rationally employ it in the second stage of croup, in conjunction, however, with antimonials. If we look for any advantage from its use, we must give it in doses of two or three grains every second or third hour. Blisters also may be applied to the sternum in the second stage of croup; and we would recommend their use in this disease, to be always directed towards the relief of the lungs, rather than of the larynx. We shall thus be prevented from ever thinking of applying them to the throat, where they create intolerable annoyance, on account of the restlessness of the child, and are, moreover, too near the actual seat of inflammation to have any effect except that of keeping it active.

In the latter periods of the second stage, when the child is cold and sinking, we must have recourse to wine, or even burnt brandy, or ammonia; but these are only to be used when all other remedies have been employed to the utmost verge that prudence will permit. Children, however, have recovered, under their use, from the most hopeless condition—and we should never despair of a sick child.

It has been proposed to perform the operation of *bronchotomy* in croup, with the objects—first, of admitting air to the lungs without the intervention of the larynx; and, secondly, of removing, mechanically, the false membrane from that passage. We have already stated that the inflammation of croup is not confined to the larynx, but extends over the whole bronchial mucous membrane; and Dr. Cheyne has shown that, in fatal cases, a space of more than two-eighths of an inch usually exists in the larynx, for the transmission of air. The patient, therefore, except in cases of sudden spasm, dies, not because air cannot have access to his lungs, but because these organs are unfitted, by their inflamed condition, from performing their own function. Consequently, bronchotomy is unnecessary for the effecting of the first object, and can do no good. As to removing the false membrane, if it could be accomplished, which those who are familiar with the morbid appearances in croup will doubt, the same ultimate objection applies, viz.—that we still have the diseased condition of the lungs remaining, and to the removal of that, we contribute nothing by opening the windpipe; but on the contrary, add a new cause of irritation.

Prophylaxis.—We have stated that croup appears to be endemic in low, damp situations, near the sea or large lakes; and from such places a child who has once suffered under the disease, or belongs to a family predisposed to it, should be removed. He should, also, be carefully and sufficiently clothed, and as little as possible exposed to the influence of cold and damp, or easterly or north-easterly winds.

VI. — OTHER INFLAMMATIONS OF THE LARYNX, INCIDENT TO CHILDREN.

The disease commonly known under the name of *Laryngitis* or *Angina Œdematosa*, is one rather of advanced life than of childhood; but there are some other inflammatory affections of the larynx which belong more especially to the latter period, and therefore call for notice here.

One of the most common of these is the inflammation arising from the attempt, occasionally made by children, to drink from the spout of a kettle containing boiling water. In these cases, the common effects of a scald are produced upon the mouth, fauces, epiglottis, pharynx, and œsophagus, varying in degree according to the quantity of heat applied, either in the shape of steam, or by the boiling water itself. The symptoms are difficulty of breathing, resembling that in croup; audible inspiration; stifled voice; usually accompanied with the sinking and debility which commonly attend severe burns and scalds and are strikingly manifested in a sunken countenance, cold extremities, and tendency to insensibility. The local appearances vary somewhat: there may be extensive inflammation and vesication of the tongue, cheeks, and fauces, with partial removal of the cuticle; or the parts may appear, as in Dr. Burgess's case,* as if a piece of raw meat was thrust into the fauces; the epiglottis is generally swollen and blistered, or, as it were, corrugated. Upon examination after death, there has been lymph observed in the trachea, in some cases, in others, the inflammation has not appeared to descend below the larynx. The former will more usually be observed in patients who have survived the accident for some days, and then marked traces of violent inflammation of the lungs will frequently coexist. The œsophagus and stomach usually escape uninjured.

These are cases in which we should, *a priori*, suppose that bronchotomy would be required, and be likely to succeed, as the obstruction is usually confined to the larynx; the trachea and bronchi being, in the first instance, sound. Much success has not, however, attended the operation, probably in consequence of the severity of the accident producing a shock which the system is unable to bear. Dr. Burgess, of Clonmel, operated twice, and with success in one instance.† Dr. M. Hall ‡ recommends scarifying the epiglottis, for the purpose of reducing the swelling, and the suggestion certainly deserves to be remembered.

With respect to general treatment, that suggested by Dr. Cheyne—viz. the administration of small doses of opium every two or three hours—appears to be the most rational, as being likely to allay irritation, and support the system under the shock which it has sustained. Dr. C. places no great confidence in bleeding; and in thinking of this remedy, we must recollect that in accidents of this kind a sudden impression upon the nervous system is produced, which causes them to differ from ordinary inflammations, and appears generally to contra-indicate blood-letting. Small quantities of soothing fluids, as almond emulsion, or cream, should be constantly placed in the mouth; and perhaps cream-ice, used in the same manner, might be of service. When the difficulty of respiration is so great as to threaten death, bronchotomy should certainly be performed without loss of time.

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* Dublin Hospital Reports, vol. iii.

† For the particulars of a case of this kind in which tracheotomy was successfully performed by Mr. Smyly; see the *Medical Press*, vol. ii. p. 320. [Note to Third Edition.]

‡ Med. Chir. Trans. vol. xii.

Inflammations originally affecting the fauces may extend to the rima glottidis and larynx; and in this way death is often suddenly caused by the obstruction occasioned to respiration, although the primary disease was not an affection of the proper air passages. Thus, in small pox, pustules may be formed upon the parts in question; and in scarlatina or diphtherite, aphthous ulceration; or a false membrane, may descend into the windpipe. In the treatment of those diseases, a great deal of attention must accordingly be paid to the state of the air passages; and it is to be recollected, that our great object must be, to *prevent* the affection from extending to these parts, as we have but little control over it when so much progress has been made. The diseases alluded to, are treated of under their proper heads.

In some of these secondary affections of the larynx, we have had occasion to observe how inadequately the symptoms; or morbid appearances explain the effects produced. We once attended a child in small pox, which went favorably through the disease up to the filling of the pustules; and, upon the last occasion of our seeing it alive, cried *without hoarseness*, and appeared to be going on as well as could be desired under the circumstances. In about four hours afterwards, a spoonful of water was placed in its mouth, which was rejected through the nostrils; and, without cough or convulsions, death instantly took place. The only remarkable morbid appearance was a dotted abrasion of the margin of the rima glottidis,—the part appearing, precisely, as if small portions of the mucous membrane had been cut off in dots with a sharp instrument. The lesion did not resemble ulceration, but rather that abrasion of the conjunctiva of the eye which we sometimes see in strumous children, the cornea beneath remaining clear. There were no pustules upon or near the epiglottis; nor any appearances in the brain sufficient to account for death.* We mention this case for the purpose of showing how apparently slight a cause may produce, in children, sudden and most unexpected dissolution.

VII.—FOREIGN BODIES IN THE LARYNX AND TRACHEA.

Children are very liable to obstructions of the respiratory function from this cause; and as the diagnosis of such a case is difficult and important, it is necessary that we should notice it, although the subject does not specially belong to the province of the child's physician. The affections with which we are most likely to confound accidents of this kind are, hooping cough, spasm of the glottis, and croup; and, in fact, many of the symptoms are those belonging to the latter disease.

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* A case similar to the above, so far as the rima glottidis was concerned, was read by Dr. Falloon before the Surgical Society of Ireland: but in it there were symptoms resembling croup, and the dotted ulceration extended into the trachea and bronchi.

The child will be suddenly attacked with a paroxysm of difficult breathing and spasmodic cough, so severe as to threaten instant suffocation,—the dyspnœa being greater during expiration than inspiration. These paroxysms recur at intervals during which the child will probably breathe hoarsely, but may in other respects appear tolerably well. During one of the paroxysms, the foreign body may be forcibly expelled from the mouth, when the symptoms will shortly cease; but if the case continue without relief, bronchitis will probably ensue, and the patient perish from that disease, or by sudden suffocation.

The means of diagnosis chiefly to be relied upon, are the history of the case, and the stethoscopic signs. If a healthy child has been suddenly attacked with spasmodic cough whilst eating, or playing with some small article (as a bead, or button,) which has simultaneously disappeared, a presumption is afforded that a foreign substance has got into the trachea. The stethoscopic signs are chiefly valuable at the commencement, before inflammation of the bronchi has set in. When the foreign body is fixed in the larynx, as is likely if it be a fish-bone or other pointed substance, the healthy respiratory murmur will be plainly distinguishable throughout the whole extent of the thorax, which will also return a clear sound upon percussion. Some mucous râle may be audible in the upper portion of the trachea, owing to the accumulation of fluid in consequence of irritation. When the foreign body is moveable,—as a button, bead, or plum-stone, would be,—its motion up and down the trachea will be occasionally heard, as well as a valve-like sound produced by its being driven in expiration against the rima glottidis. There may also be perceived, at times, a temporary interruption to respiration in one lung, when the body happens to be impacted in the corresponding bronchus,—the respiratory sound again returning when the obstruction has been removed by a violent expiration. It is said that the foreign body is most likely to pass into the right bronchus, and that hence it is in the right lung we shall most frequently observe the obstruction of respiration.*

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* We can never be too careful in investigating the *history* of sudden laryngeal affections: one among several instances in point, which came within our own observation, it may, perhaps, be well to mention briefly: a child of three or four years old was suddenly seized with symptoms of croup, and actively treated accordingly, for some days, when as it was not becoming better, our opinion was sought for. It then appeared, upon close examination, that about the time of the first seizure the child had been playing in the kitchen, whilst the servants were dining upon herrings. The discovery of this circumstance led to the diagnosis of

The treatment indicated in these cases is unquestionably bronchotomy, which if the body be in the larynx, or loose in the trachea, may be looked upon as affording a fair prospect of success. The subject, however, must be gravely considered, before resorting to so formidable an operation; and we must carefully collate the physical signs, with the history, both of the accident and of the previous state of the child's health, before we decide. The diseases likely to produce error sometimes invade very suddenly; but there is generally some appearance of illness previously, and their invasion is usually accompanied with signs of general fever and disturbance of the system, which are wanting immediately after an accident.

Foreign bodies, (as pieces of meat,) stopping in the fauces, and pressing upon the epiglottis, may produce all the distressing symptoms occasioned at the first passing of any substance into the larynx, and may occasion sudden suffocation. In this case, relief may be given by passing in the finger and removing the obstruction, or by pushing it down the œsophagus by a probang; but frequently, the body is beyond the reach of the finger, and the emergency is so great as to admit of no delay, so that the only resource, and means of saving the patient, is the instant performance of bronchotomy. The nature of the operation, and other considerations belonging to it, fall within the limits of general surgery.

VIII.—SPASM OF THE GLOTTIS.

A good deal of confusion appears to exist among medical writers, with regard to the application of this term,—partly owing to its being now applied to a disease which was formerly described under sundry names; and partly to its being made to include, in common parlance, affections which perhaps have nothing in common, except the occasional occurrence of very sudden death. The disease described by Sir Henry Marsh as "spasm of the glottis,"[*] appears to be identical with—"the acute asthma" of Millar, "Die krampfhafte Engbrüstigkeit" of the Germans, "the inward fits" of Underwood, "the peculiar species of convulsion" of Dr. John Clarke, "the cerebral croup" of Mr. Pretty, "the laryngismus stridulus" of Good, and "the thymic asthma" of Dr. Kopp, and other late German writers. By others it has been confounded with the early stage of croup, or that mild threatening of the disease

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the real nature of the case: bronchotomy was recommended, and after considerable delay performed; but too late to save the patient. After death, however, a herring-bone was found sticking in the ventricle of the larynx. See also a case by Dr. Evanson in the 5th vol. Dub Med. Journal.

[*] Dublin Hospital Reports, vol. v.

which occasionally occurs in irritable children, and has thence been denominated, "spasmodic croup." In common parlance the term has been made the *asylum ignorantiæ* in all cases of sudden and unaccountable death occurring among children.

A striking picture of the disease, as we understand it, is given in the able paper of Sir Henry Marsh, already cited. It occurs during the first two or three years of life, and appears to be frequently connected with dentition, and a deranged state of the digestive system, or of the general health, produced by impure air, fever, unsuitable nourishment, &c. At the commencement, the child, without perhaps showing any previous indications of illness, will be observed to awake suddenly from sleep, as if alarmed; to struggle for breath, exhibiting all the signs of obstructed respiration, and after repeated efforts, to recover with a long and sonorous inspiration, like that in hooping-cough. Subsequently, the paroxysm may occur when the child is awake, especially if it be frightened or vexed. During the fit, the face often becomes swollen and purplish. After some time, as the disease advances, the hands and feet become slightly swelled, and the fingers and toes rigid, the thumb being frequently drawn into the palm of the clenched hand. We have observed the spasm to affect the extensor muscles, and to produce a permanent spreading and extension of the fingers, which, so far as our experience goes, appears to betoken less serious lesion of the nervous system than the opposite condition. As the disease advances, the health becomes considerably deranged, the bowels are out of order, stools green and slimy or curdy, child pale and unhealthy looking. If neglected, general and fatal convulsions may supervene. The pathognomonic of the disease, according to Dr. Cheyne,* is crowing inspiration, with purple complexion, *not followed by cough.* We have noticed cases in which the crowing inspiration had a considerable degree of permanency, and was not confined merely to the period of occurrence of the fit. The duration of the disease is very various: the child may be cut off suddenly in a paroxysm, by suffocation, or it may have attacks at intervals for several months, and yet recover.

The pathology of spasm of the glottis is still very obscure. Sir Henry Marsh considers it to be primarily a spasmodic affection of the muscles of the glottis, and that it is only when the disease increases in severity, and when general convulsions arise, that the brain or its membranes, become the seat of disease. He suggests that the primary lesion *may* exist at the origin of the pneumo-gastric nerve. He found the disease usually to occur in children of a strumous diathesis, and frequently, though not universally, to be complicated with painful dentition. Clark and Cheyne conceived the seat of the disease to be in the brain. Kopp refers its cause to hypertrophy of the thymus gland, occasioning pressure upon the heart, lungs, and great vessels. More recently, Dr. Hugh Ley has published a lengthy essay upon spasm of the glottis, or laryngismus stridulus, as he terms it, in which he refers its cause to enlargement of the bronchial, or deep cervical lymphatic glands, producing pressure upon the recurrent nerves, and consequent paralysis of the muscles supplied by them. Without going into a consideration of these various theories, it will be sufficient to say, that the affection is too constantly curable, and too frequently yields to a removal of specific irritations, as from dentition, deranged bowels, or indigestible aliment, to admit of its being referred to a cause decidedly organic. That enlargements of the bronchial, cervical and thymus glands are occasionally met with, as complications, we have no doubt; but when we recollect that the subjects of the complaint are usually of a delicate and strumous habit, such appearances are not to be looked upon as of much importance in relation to its special pathology. These remarks equally apply to other hypotheses having for their basis organic lesions; and, therefore, we are inclined to adopt Sir Henry Marsh's view, and consider spasm of the glottis as essentially a spasmodic affection, but one liable to many organic complications, both accidental, and consequent upon the continuance of the irritation which it occasions in the system.

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* Treatise on Hydrocephalus.

The *treatment* of spasm of the glottis recommended by writers varies much, according to their views of its pathology. Our experience of the frequent complications of the disease with difficult dentition, derangements of the digestive system, and with marks of a scrofulous diathesis, as well as its occasional dependence upon exposure to impure air, (the spasms, in a case of Sir Henry Marsh's recurred whenever the patient was brought back to a newly painted house,) have hitherto induced us to adopt the following plan.

We would endeavor by all suitable means in our power to remove complications, and restore the general health. When the bowels are deranged, alterative aperients should be used. If we observe teeth approaching the surface, the gums over them should be divided. If the child be suckling, all artificial food should be interdicted, a fresh and healthy nurse should be provided, and removal into pure air effected. When there is no manifest complication, small doses of sulphate of quinine or iodine may be given as tonics. Sir Henry Marsh found much advantage in the employment of the *tinctura fuli-*

ginis of the old pharmacopœias. All causes of excitement or irritation should be avoided; and during the fit, the child should be held up, and exposed to a draught of cool air. Every indication of an approaching affection of the head should be jealously watched, and treated according to circumstances.*

Those who refer the disease to a hypertrophied condition of the thymus gland, advise a different mode of treatment, directed towards the lessening of congestion in that organ, viz., "a very low diet; abundant and often repeated local bleedings; issues on the chest; frequent energetic purgatives; with a choice of mercurials, antimonials, cicuta, digitalis, animal charcoal, and iodine."†

If we are justified, and we think we are, (at least in the absence of more certain knowledge,) in adopting Dr. Gooch's principle, of viewing the effects of remedies as tests for determining the differences of morbid conditions, our own experience tells us that the alterative and tonic plan we have recommended is the proper one; and that the disease *we have described* will always be aggravated by treating it, in the first instance, as an inflammatory or congestive affection. If, in its progress, it should be complicated with congestion within the head, depletion may become necessary, according to the indications which will be considered when we are treating of head affections; but even then, the cachectic character of the primary disease must not be forgotten.

We have stated that death sometimes takes place in children, with unaccountable suddenness, and that such cases are usually referred to *Spasm of the Glottis.* For anything we know to the contrary, at present, it may be that the term is rightly applied; but we wish to point out that the disease which we have been just describing, under the title of *Spasm of the Glottis*, has distinct characters and symptoms, which mark it as different from the class of cases to which we are now alluding. We shall briefly state the particulars of the last instance of the kind which has fallen within our notice, as the simplest mode of illustrating our views.

A child of eight or nine months old was apparently recovering well from hooping cough; its bowels were not materially deranged, it sucked well, and the cough was becoming less frequent and severe. The only remarkable circumstance was, that alarm was two or three times excited among its attendants, by the sudden occurrence of an unusual agitation in its breathing; which, however, was so transient that no very clear account of its nature could be obtained. On the day of its death, it appeared lively, and better than usual; but towards evening, while lying on its mother's lap, without cough, convulsion, or struggle of any kind, it suddenly expired. A careful examination was made of all the cavities, about eighteen hours after death, but without discovering any morbid appearance whatsoever. There was here no *crowing inspiration*, *purple complexion*, or other mark of obstructed respiration, or suffocation, which are so many pathognomonics of the disease we first described.

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* See chapter on Affections of the Head.

† Dublin Medical Journal, vol. ix. p. 521.

We know of many occurrences similar to that just narrated. Professor Montgomery has lately given an account of some which fell under his notice.* He relates two in which there was some enlargement of the thymus gland, and refers the fatal result to the pressure of that organ upon the trachea and great vessels and nerves. That this is not the constant cause of the event (we can scarcely call it a disease), we are perfectly certain; for, in the foregoing case, the thymus gland was in a normal condition. It is probable, however, that there may be more than one occasional cause, and every observation upon the subject is interesting.

As to the *treatment*, we have little to offer—the child is generally dead before we hear of its being ill; but if our attention be directed to any unaccountable agitation in the breathing of an infant, we would be disposed to treat it upon the plan, already recommended in this section, for improving the general health. If there be any appearance of enlargement or fulness in the region of the thymus gland, and the condition of the child warrants us in supposing this to be of an inflammatory or congestive nature, a leech may be applied over the sternum, and subsequently some slightly irritating liniment rubbed upon the part. If we have reason to suppose the enlargement to be scrofulous, the internal use of iodine will probably be of service. If we happen to be with a child at the moment of seizure, the performance of tracheotomy would undoubtedly be warrantable.

IX.—HOOPING COUGH (PERTUSSIS).

This affection being one of those which *regularly* occur but once in the same individual, and that generally at an early period of life, it must be considered as a disease of childhood, although the memory of every practitioner will furnish him with instances of its invasion of even elderly subjects.

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* Dublin Medical Journal, vol. ix.

The common notion is, that hooping cough is infectious, and that it is always propagated by infection; but this has been doubted by many French and German writers, as Billard, Gardien, Wendt, and Stoll, who consider it as rather of an epidemic nature. This, like other questions of the kind, it is next to impossible to determine, as we have absolutely no means of distinguishing between an epidemic and contagious propagation of disease. It is quite certain, however, that hooping cough prevails most at particular seasons of the year, viz., at the close of winter and commencement of spring; and thus, whether or not it be spread, in individual instances, by contagion, it manifestly possesses epidemic characters. Girtanner[*] has advanced the notion, that the disease owes its origin to a specific miasm, analogous to that of marshes; but for this opinion we may at least say, that there is no foundation of fact.

Symptoms.—Hooping cough commences, like an ordinary catarrh, with feverishness, thirst, coryza, tenderness of the eyes, and a frequent, dry cough. These conditions, which include no diagnostic marks of the disease, constitute the stage of incubation, and usually continue from four or five to ten days, although in some instances this stage is but little marked. At the end of the period of incubation, the cough changes in character, and assumes the peculiar convulsive form which belongs to the disease. It occurs in paroxysms, or *kinks*, at intervals varying from half an hour to three or four hours, and is accompanied by long and noisy inspirations, with a crowing and whooping sound. This is pathognomic of the disease, and has given it a name in most languages.[†] In some varieties, however, as when the patient is an adult, or a very young infant, the whoop may not be distinctly marked.

During the paroxysm, the patient usually shows all the signs of impending suffocation—the face and neck become red, swelled, and often livid; the vessels of the head are full, and a *tensive* pain is experienced in the forehead; the eyes water, and appear as if starting from their sockets; the pulse becomes quick; the patient is greatly agitated, and lays hold of any fixed object which may be within reach. After this state has continued for a few minutes (more or less) the contents of the stomach are generally discharged, together with a large quantity of mucus, whereupon the coughing ceases, and the patient gradually recovers tranquillity. In severe cases, discharges of blood may take place, during the paroxysms, from the nose, eyes, lungs, or stomach, and even, (it is said, though we have never witnessed it,) from the ears. Involuntary discharges may also occur from the bladder and bowels. Occasionally the patient falls down in a faint, from the extreme violence of the fit. The paroxysm returns with some degree of periodicity; but it is often brought on irregularly by a full meal, exposure to cold, or any excitement.

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[*] Christoph. Girtanner über die Krankheiten der Kinder, Berlin, 1794.

[†] In the old English works it is called *Kink-cough;* by the Scotch, *Kink-hoast;* by the French, *Coqueluche*, (explained by Billard to signify a cough coming from a person whose head is covered with a hood;) by the Germans, *Stick-husten*, *Keich-husten*, and in some parts, *Esels-husten*, the whoop being likened to the braying of an ass.

When the second stage has fairly set in, the symptoms of catarrh, in favorable cases, abate, and the fever is often very slight,—the patient being lively, and inclined to eat, during the intervals. The skin, however, is usually somewhat hotter than natural, and the child pale, and obviously out of order. The second stage of pertussis appears to have a definite duration—in favorable cases, about three or four weeks—at the end of which it begins naturally to decline in severity, the secretion of mucus becoming more abundant, the cough looser, the paroxysms less violent and fatiguing, and the intervals longer, until at length, in two or three months from the first onset, the disease ceases altogether. The duration of the second stage, however, though it probably cannot be very much shortened by art, admits of being considerably extended by many accidental circumstances, as taking of cold, or severity of weather; and relapses of the convulsive cough are liable to occur, even after the patient has appeared for several days to be altogether free from the disease.

Pathology.—Morbid anatomy has thrown no light upon the proximate cause of hooping cough; and accordingly, as is always the case in the absence of exact knowledge, the subject has been deluged with a flood of hypotheses, none of which, however, can claim to be more than plausible guesses: many are merely a re-stating of ignorance, in obscure, and therefore (according to the notion of some) scientific words. The fact is, the simple disease is probably never fatal; and consequently, any appearances which we may meet with in the dead body are the results of complication—e. g. marks of inflammation in the lungs or brain.

We shall now merely allude to some of the opinions in question. By Cullen, hooping cough was placed among the neuroses, and considered as a specific irritation of the nervous system. Hufeland, Paldamus, Jahn, Breschet, and others, supposed the particular lesion to be in the phrenic and pneumogastric nerves. Löbenstein-Löbel believed it to exist primarily in the diaphragm, and that the irritation was subsequently communicated to the nerves just mentioned.* Webster locates the disease in the brain itself. Watt, Marcus, Albers, and Guersent, look upon it as a simple bronchitis; Desruelles, as a bronchitis followed by cerebral irritation—a *broncho-cephalite*, as he terms it. To a similar view, Dr. Charles Johnson also appears to incline.* Dr. Butter designates the bowels as the seat of the primary lesion. Autenrieth believes the *origo mali* to be a determination of morbid matter towards the bronchi, and hopes to divert it away by exciting morbid pustules upon the skin. Holzhausen and Clarus found, in the body of a boy who had died of hooping cough, the phrenic nerves loose in texture, and somewhat swollen; the trunks of the *vagi* likewise looser, thicker, and broader than natural; the great sympathetic and splanchnics, especially the latter, of a firmer consistence than usual; and the cœliac plexus firmer and somewhat elevated.† But, in point of fact, there is no part of the body which has not been found diseased after hooping cough, and assigned as its seat by those who argue *post hoc, ergo propter hoc;* as an example of which we may mention, that Girtanner lays some stress upon his having found the parts of generation in a morbid condition upon these occasions.

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* See Wendt, op. cit.

We shall not add to this tangled web of opinions by any speculation of our own, but freely confess our entire ignorance as to the intimate nature of the affection. All we know is, that the symptoms in the first stage show the bronchial mucous membrane to be in a state of irritation, if not inflammation; and that in the second they assume a distinctly spasmodic character.

Diagnosis.—The diagnostics of hooping cough are, the whoop and the paroxysmal character of the cough, by which when it is uncomplicated, it may be readily distinguished from all other diseases.

Prognosis.—In simple pertussis, occurring in a healthy child, the prognosis is favorable; but should always be modified by a due regard to the liability to occurrence of dangerous complications, which is so great as to cause the deaths under the head of hooping cough to constitute a formidable item in bills of mortality. Those complications are most likely to occur, and to be dangerous, in very young children, in those just weaned, or suffering from dentition or other causes of delicate health; and in those of a naturally unsound constitution. All these collateral circumstances should therefore be taken into account, in giving our prognosis, and the danger of the sudden supervention of another disease distinctly adverted to.

Treatment.—The treatment in simple, uncomplicated hooping cough, must be one rather of prevention than cure. Our chief object should be to avert inflammations or congestions of important viscera, as the lungs, brain, or digestive apparatus. During the stage of irritation of the bronchial membrane, we must keep down the general and local fever, by quietude, low diet, and such evacuants as the symptoms may demand. A mild emetic of ipecacuan will almost always be serviceable, and will generally accomplish another indication, by freeing the bowels.* Should it not do this, however, we may administer one of the aperients recommended in Chap. VI. The child, during the first stage, should certainly be confined to its apartment, which should be well ventilated, but kept moderately warm; and we should not be led to deviate from this rule by the popular notion, that change of air is good for the disease. The notion is quite true in the latter stages, when the cough is obviously spasmodic, and kept up more by habit, than by any actual irritation; but it leads to very injurious consequences, when acted upon during the irritative period. The state of the lungs must be carefully watched throughout, and the first symptoms of an inflammatory kind, met at once by bleeding and leeches. Should no untoward circumstances, however, intervene, the first stage will pass on without a necessity arising for active treatment; the bronchial irritation will gradually subside, and the cough assume the spasmodic character.

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* See his able article, "Hooping Cough," Cyclopædia of Practical Medicine.

† Wendt, op. cit.

It is at this period, when the fever has abated, and the appetite is beginning to return, with at the same time, a complete freedom from wheezing, or other indication of pulmonary affection during the intervals, that we shall find change of air productive of benefit, and that we shall be enabled to employ any of those anti-spasmodic medicines which are in general repute. We must, however, still observe great caution. Fine weather should be selected for bringing the child into the open air, and it should always be well clothed and protected from the cold.

Something perhaps may be done in breaking the habit of the disease, by tonics or anti-spasmodics, and a vast variety of such have been recommended—too great a variety, indeed, to allow of our putting much faith in any single specimen. Cantharides, with bark, has been much recommended, and, when used in suitable cases, will sometimes be found serviceable.* We have also found belladonna useful, in doses of an eighth of a grain, three or four times daily. Oxide of zinc was recommended by Guersent, in doses of a grain, every hour; cicuta, by Butter and Störk; extract of tobacco, by Stoll, Hufeland, and Thilenius; wild rosemary, by Linnæus and Wahlborn; arsenical solution, in doses of a drop daily, by Dr. Ferriar; but it is needless to encumber our pages with an enumeration of more specifics, as their very multiplicity affords a strong presumption in favor of their inefficacy. Autenrieth, arguing upon his theory of the nature of the disease,—viz. that it was a determination of peccant matter upon the lungs, has advised the derivation of this matter toward the surface of the body, by the employment of tartar emetic ointment, so as to bring out a crop of pustules; but this is merely a clumsy and unmanageable mode of counter-irritation, and is not suitable in child's medicine.

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* The prescriptions of Fothergill and Pearson will, either of them, answer well under the above mentioned circumstances. The former is—

℞ Pulv. e. Chel. Cancr. ʒss
Tartar. Emet. gr. ij M.
Accuratè misceantur—gr. i—gr. ij indies.

The latter—

℞ Tincturæ Opii guttam
Vini Ipecacuan. gtts. v
Carb. Sodæ gr. ij M
Ft. Pulvis quartâ quâque horâ sumendus.

After all that has been said and written respecting specifics for hooping cough, perhaps as good a medicine as any during the decline of the complaint, will be one of the expectorant mixtures prescribed in Chapter VI.†

During the whole progress of a case of hooping cough, we must be alertly upon the watch for the first signs of local inflammations. The most common of these is bronchitis, the symptoms and treatment of which are detailed under their proper head. Here, we have only to say that when it does supervene or threaten, it must be met by active depletion and loss of blood, general or local, according to the symptoms; and from this practice we are not to be deterred by any preconceived ideas as to the nervous or spasmodic nature of the primary disease. We cannot too often repeat, that the great danger of pertussis arises from the likelihood of the supervention of local inflammation requiring active and prompt treatment.

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* The following formula was much employed by the late Dr. Beatty, of Dublin:

℞ Tinct. Cinchon. Comp. ℥v
——— Cantharid.
——— Opii Camphor. â. â. ℥ss M.
ʒss—ʒi ex cyatho decocti hordei ter indies.

Burton, the original proposer of cantharides in hooping cough, gave it in powder, as follows:

℞ Cantharid.
Camphor. â. â. ℈i
Extract. Cinchon. ʒiij M.
Tere simul—gr. viij tertiâ vel quartâ quâque horâ.

† Nos. 15, 17, 19.

Other local affections, very apt to complicate hooping cough, are hydrocephalus, or convulsions, and the probability of their occurrence should never be lost sight of. The symptoms and treatment of these affections will be adverted to in their proper place; but we may mention that clenching of the hands, the thumbs being turned into the palms, drowsiness, screaming out during sleep, and as Dr. Johnson justly remarks, "greater irritability of the stomach than we can account for, or than is natural during hooping cough," are marks which always call for our most strenuous exertions for the aversion of head affections.

Remittent fever, and severe derangement of the bowels, is a common complication of the second stage of pertussis, and is not unfrequently dangerous, or even fatal. The fever, and the increase of the cough and hurry of the respiration, which commonly attend upon it, may often lead us to mistake this complication for bronchial inflammation. The diagnosis must be derived from the absence of direct signs (as the auscultatory) of pulmonary disease; the occurrence of distinct remissions; the condition of the mucous membrane, and other symptoms,—all of which have been dwelt upon, when treating of remittent fever. The liability to the occurrence of derangement of the bowels, should warn us against the indiscriminate and wanton use of purgative or other irritating medicines, in the treatment of hooping cough. Many simple cases of the affection have been, no doubt, hampered with dangerous complications, by this unhappy practice. For the management of derangement of the bowels and remittent fever, we must refer to the chapter devoted to those subjects.

When hooping cough happens to attack a child while undergoing the process of dentition, very special attention to the case is demanded. At this period, both the abdomen and head are peculiarly likely to be engaged; and we shall best prevent these occurrences by carefully watching the state of the gums, and treating them according to the principles laid down in the chapter upon Dentition.

CHAPTER XI.

DISEASES OF THE CEREBRAL SYSTEM.

I.—FUNCTIONAL DISEASES.

The peculiarities of structure to be observed in the nervous system of the infant have been already pointed out, and sufficiently account for the facility with which disturbance of that system takes place during childhood.

The great susceptibility to impressions, in consequence of the large mass of brain[*] and the readiness with which the balance of the circulation is deranged, in consequence of its great vascularity, frequently give rise to a state of morbid irritation or congestion, which, though not constituting organic disease, may soon lead thereto. We shall consider separately the disorders of the cerebral system connected with inflammatory action, and those existing independently of inflammation. The latter may give rise to very serious symptoms, or even lead to a very fatal result, as we witness in certain cases of irritation, congestion, convulsions, &c. &c., of which we now proceed to treat.

We recognise the symptoms of *morbid irritation*, or erethysm of the brain, (as Dr. Whitlock Nicol calls it,) when we perceive an unusual degree of acuteness in the sensations of a child; while it is fretful, unquiet, or affected with wakefulness. Noise and light are disliked, the eye being as over-sensitive as the ear, and often winking before a bright light; or the lids are spasmodically closed. The hand is occasionally clenched, or the thumb thrown across the palm; and frequently, sneezing is present. The temperature of the body, and state of the pulse, are both natural, though occasionally the skin may be hot or the pulse raised; but the signs of determination of blood to the head are absent. If the spinal marrow be engaged in the irritation, the head is thrown back; or there may be some degree of opisthotonos present, with occasional twitchings or convulsive movements of the limbs, and great sensitiveness of the whole surface.

Wakefulness is a very prominent character of nervous irritation in the child, and should always arrest attention. When obstinate, it is a dangerous sign, often preceding inflammation of the brain, particularly in children predisposed to hydrocephalus, or who are laboring under fevers, as measles, scarlatina, &c. &c. In the latter disease, especially, this symptom is often as distressing as it is dangerous.

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[*] M Billard, however, has noticed that affections of the spinal cord are more frequent in the young infant than those of the brain; and M. Ollivier states that the symptoms of the former are much better marked than those of the latter—the functions of the brain being as yet so little exercised, in consequence of its imperfect structure, that their disturbance scarcely attracts notice.

Somnolency is an occasional symptom of sympathy of the brain, with an overloaded state of the stomach, or costive condition of the bowels; and a tendency to drowsiness, or even stupor, will often vanish on the exhibition of a brisk cathartic. The presence of worms may occasionally give rise to similar symptoms.

The common causes of morbid irritation in the brain are, debility, or the excitement produced by stimulants improperly given; a deranged state of the bowels, the injurious effects of low, damp situations, and ill-ventilated apartments; or moral impressions, such as fear, anger, &c. We have already pointed out the relation between this state and the process of dentition (p. 201). In all these cases, irritation is very prone to pass into inflammation, and thus hydrocephalus may be established.

Treatment.—Our first effort must be to ascertain and remove the cause of this affection; our next, to apply such means as are calculated directly to allay the morbid irritability of the nervous system. The state of the bowels primarily demands attention, as also the character of the secretions. Care must be taken to regulate the diet, which should be nutritious without being stimulating; and removal to a healthful situation, if necessary, or, at all events, free exposure in the open air, (while exposure to noise or a bright light are avoided,) is essential in restoring the balance of the nervous system. Cold to the head, (which should be daily sponged with vinegar and cold water,) while the feet are occasionally immersed in warm water, or the warm bath employed, are measures directly calculated to allay the irritable condition of the brain, and in particular to restore sleep, when wakefulness is present. In some alarming cases of this description, we have seen tranquillity quickly restored, and sleep induced, by the use of the warm bath, while cold was, at the same time, assiduously applied to the head, and the application continued until the child appeared to grow faint. In this form of cerebral affection, the judicious use of narcotics is of signal service; but they need not be resorted to, until the other means mentioned have been tried. In acute cases of morbid irritation, where the symptoms approach those of inflammation, our treatment must be more active—leeches, cold to the head, active purgatives, or counter-irritation, being employed; and such should always precede the use of narcotics in these cases.

Congestion is not an unfrequent condition of the brain during infancy, and may be present immediately after birth; but the symptoms are very often obscure. We consider that congestion is present, however, when a child is stupid and heavy; the head looking full, and being, perhaps, hotter than usual; with the veins distended, and dark-colored, or the countenance livid; and the pulse slow, or it may be irregular. The pupils are usually dilated, the eyes looking vacant, or they are with difficulty fixed on the same object. The state of the fontanelles (as we remarked in our chapter on Diagnosis) affords an important source of information; and this, though seldom set forth in books, is always to be looked to by the practical physician. A permanently elevated and convex condition of the fontanelle, joined to the above symptoms, leaves no doubt of the existence of congestion of the brain.

Cerebral congestion is liable to occur at the commencement or towards the conclusion of the exanthems in the child, and is always to be regarded as a serious symptom. Congestion may lead to inflammation, but is less likely to do so than irritation; more particularly in young infants, in whom Billard remarks that inflammation is much less liable to follow congestion of the brain, than when either the stomach or lungs are the seat of this affection.

Congestion more frequently leads to effusion, and in some cases this occurs very rapidly. We have seen a child suddenly seized with an attack of convulsions, accompanied by signs of congestion, and dying comatose in less than twenty-four hours. Venous congestion of the pia mater, with copious effusion into the ventricles, were the appearances found after death. Mere irritation seems, however, capable of producing similar results —effusion being found, but with little signs of congestion; and inflammatory action at times runs this course so rapidly, that doubts must be entertained as to whether such had previously existed. Gölis speaks of attacks of this description, which he calls "the water-stroke,"—effusion and death taking place in a few hours. He looks upon this as a variety of hydrocephalus, the inflammation and effusion being almost coincident; and hence he designates it as hyper-acute. This form of the complaint may be idiopathic; but is generally brought on by the sudden suppression of some accustomed discharge, or the repulsion of one of the exanthemata.

Effusion.—No signs, exclusively indicative of effusion, appear to exist, as is now acknowledged; for those usually enumerated may be present without effusion having taken place, while effusion is occasionally found where no such signs are present. When, however, the head gradually enlarges, with the fontanelles full, we may consider that effusion is the cause; or in more rapid cases, insensibility, with muscular relaxation, debility or paralysis, generally indicates the presence of effusion.

We have seen cases in which the head enlarged during the presence of febrile symptoms, and those of cerebral excitement, but without dilated pupil, coma, or paralysis; and which we were inclined to look upon as cases of hypertrophy of the brain, that again subsided under the use of antiphlogistic measures.

Treatment.—This will consist, in cases of congestion, in the assiduous application of cold to the head, while heat is at the same time applied to the extremities, or the general warm bath employed. The bowels should be emptied out by purgative enemata; and occasionally leeches may be required; but they should be used with caution, and are better applied to one of the extremities, or the back of the neck, than directly to the head. Sinapisms, or blisters, will be more frequently necessary, and they should be first used on the extremities; but afterwards counter-irritation, applied directly to the head, is most serviceable.

Hydrencephaloid Disease.—The attention of the profession has been directed, by Dr. Marshall Hall,[*] to a train of symptoms occasionally met with in children, and similar to some that occur in congestion or hydrocephalus; but which differ from these in certain respects, particularly in being induced by a state of exhaustion; and which, therefore, require a plan of treatment opposite to that necessary for an inflammatory affection. Dr. Gooch[†] has also treated of this subject; and it has been alluded to by Dr. Abercrombie. The disease is called hydrencephaloid, to distinguish it from inflammatory hydrocephalus. It can hardly be looked upon as a disease, however, but rather as a condition of the system leading to symptoms of oppression of the brain, unconnected with an inflammatory origin, but which may succeed to an inflammatory affection, when depletion, particularly blood-letting, has been carried too far. From such source, Dr. M. Hall saw it generally arise, and found it connected with congestion. Dr. Gooch saw it arise from a delicate state of constitution, independently of this source, and found the ventricles distended with fluid, but the vessels of the brain remarkably empty.

The symptoms are, drowsiness, with occasional delirium; the pupils are dilated, the eyes being kept usually half-closed, and there may be squinting or blindness; the pulse is feeble, but may be quick, slow, or irregular; the surface is cool, particularly the face and extremities; the breathing becomes hurried and unequal, and the child, if unassisted or mismanaged, dies comatose or convulsed.

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[*] See Dr. M. Hall on Morbid Affection of Infancy, &c.

[†] See Gooch on Diseases of Women, p. 355.

The treatment consists in supporting the strength by nourishing diet and stimulants, as beef-tea or arrow-root, and giving aromatic spirit of ammonia, or brandy, (from five to ten drops for a dose,) until re-action is established, when the use of stimulants is to be cautiously withdrawn. Should much restlessness be present, small doses of opium are to be given, or the warm bath employed. Purging or vomiting, if present, is to be checked.

In this disease, we must be careful to avoid putting cold to the head, or raising the child suddenly up, and keeping it in an erect posture. By attention to these particulars, children may be saved, who are said to be dying from hydrocephalus, but who must have irretrievably perished had antiphlogistic measures been employed.

The necessity for taking the entire condition of the patient into account, in affections of the head, and not merely looking to the cerebral symptoms, is admirably illustrated by these cases.

Convulsions may be induced by any of the morbid conditions of the nervous system of which we have spoken, or may be merely sympathetic. Convulsions are not, generally speaking, so dangerous an affection as might be at first imagined; nor is the degree of danger directly proportionate to the violence of the attack, as slight convulsive movements may indicate a more serious affection than violent convulsions. When very violent or often repeated, however, a fatal termination or an incurable state of paralysis, may result.*

Very young infants are liable to a spasmodic affection, to which nurses give the name of *inward fits.* The infant smiles often in its sleep, and rolls about its eyes; the mouth being occasionally drawn down, with slight twitchings of the lips, and at times there is some surrounding blueness. This state, which can hardly be called one of convulsion, is usually induced by over-distension of the stomach or bowels, from the presence of flatulency or undigested food; and will be relieved on removing its cause by the exhibition of a mild aperient, or a few drops of turpentine, or spirit of ammonia, in an aromatic water.

Symptoms.—During a severe attack of convulsions, all the voluntary, and many of the involuntary muscles, are spasmodically contracted. There is starting of the eyes, or distortion of the eye-balls; the tongue is protruded, and there is foaming at the mouth. The head and face are often red at the commencement of the attack, but become purplish towards the conclusion, as likewise at times does the whole body. The respiration is obstructed or laborious; and the hands are, in general, firmly clenched, as well as the limbs being in violent motion. The attack may be momentary, or continue but for a short time; or the convulsions may be frequently repeated, and last for many days. As the paroxysm subsides, the convulsive movements become less frequent, and less violent; the muscular contractions relax; the natural appearance returns, and the child becomes able to cry, having taken a full and deep inspiration. A calm sleep often follows, attended by a free perspiration; and the child awakes refreshed, and apparently quite recovered.

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* According to M. Billard's experience, the convulsive attacks of young infants arise most frequently from an affection of the spinal cord or its membranes.

The convulsive attack may be much milder than that just described. Only one limb, or one side of the body, may be convulsed; and this may alternate occasionally, or several times in succession, with a similar condition of the opposite side. The face alone may be affected, or only slight twitchings of this part, or of the limbs, be present, with some blueness about the mouth, and perhaps distortion of one of the eyes. Neither fever nor disturbance of the mental faculties necessarily attend an attack of convulsions; but when they do, or the circulation is much accelerated previous to the attack, an inflammatory affection is to be apprehended. Convulsion attends on a directly opposite state, however,—one of depression or debility,—as has been described under the head of hydrencephaloid disease.

Convulsions may come on suddenly, without any previous warning, or there being any derangement in the child's health, to account for the attack. Generally they occur in children who are in delicate health, and hence their nervous system in a state of morbid irritability. Under these circumstances, very slight causes will occasionally induce an attack; as any sudden fright, the irritation of teething, pain, flatulency, constipation, the ingestion of unwholesome food, the presence of worms, or the sudden suppression of an eruptive disease, or accustomed discharge.

Some precursory signs, however, often attend; and these, in general, indicate a highly irritable state of the nervous system. In addition to the characters already enumerated, as belonging to this state (see p. 319), we observe, in particular, when convulsions threaten, some unusual appearances about the eyes, which are frequently fixed, or in oscillatory motion, the pupils suddenly contracting or dilating; or there may be want of consent between the pupils,—one being dilated while the other is contracted; or difficulty in fixing the eyes together on one object. The condition of the hands and feet specially deserves attention. There are frequent twitchings of the fingers or toes; the hand is clenched, and the thumb pressed stiffly across the palm; or the wrist is bent downwards, as well as the foot, and the toes drawn in. Sudden animation is often followed by languor, and the breathing is irregular; in particular, a long and deep inspiration often follows short catchings of the breath. There is alternate flushing and paleness of the face; or the countenance looks pinched up, and a peculiar blueness is observed about the mouth.

Prognosis.—As delicate and irritable children are more easily thrown into convulsions than those that are robust; so we must look upon convulsions as more dangerous in the latter, especially when connected with inflammatory diseases. The worst cases that we have seen, occurred in such; but in any instance, the attack may prove fatal, if violent, and hence our prognosis must be always guarded. As convulsions can never be looked upon as purely idiopathic, much will depend on our being able to ascertain and remove their causes; and this should form the object of our treatment, not merely an attempt to palliate or control the convulsive motions.

Treatment.—Having endeavored to remove or mitigate any source of irritation,—as by freeing the bowels when loaded, dividing the gums if requisite, or using antiphlogistic measures to subdue inflammatory action when present, much does not require to be done for the convulsive attack itself, as this generally tends to pass away of its own accord. Attempts to stop the convulsions by opiates, stimulants, &c., will always do harm, unless where the symptoms clearly arise from irritation or exhaustion. The child's clothes should be always loosened, the head elevated, cold air admitted, and the face sprinkled with cold water. The application of cold to the head is the remedy of most general utility, and most effectual in abridging the paroxysm and preventing its return. The use of heat to the feet, or the warm bath, at the same time, is of signal service, adding much to the efficacy of the cold applications. The mode of applying cold now universally adopted in cases of convulsion, is by pouring a stream of water on the head, from a vessel held at a little distance over it, and continued until the attack subsides. Leeches are occasionally required, if much febrile excitement or oppression of brain are present. It is often difficult to move the bowels in such cases; but purgatives, which are in most instances requisite, will act more easily after leeching has been practised. Purgative enemata, with turpentine, often give speedy relief. When much restlessness or nervous irritation is present, small doses of Dover's powder are often of great service; but in convulsive attacks attendant on inflammatory action, great injury may be done in attempting to control the convulsions by narcotics. Still more particular must we be to avoid the use of stimulants, sometimes employed as anti-spasmodics, but which always aggravate or renew the convulsions in such cases. It is when debility is the cause of convulsions (as in the hydrencephaloid disease), that stimulants, as ammonia, brandy, or turpentine, must be resorted to. After convulsions have once attacked a child, they are liable to recur; and care must be taken to avoid every exciting cause, and all means must be employed to improve the general health and strength: in delicate children, change of air, and tonic medicines, are essential.

II.—INFLAMMATORY AFFECTIONS.

The brain, or its membranes, may be attacked with acute inflammation in the child, as well as the adult; but this form of inflammation is comparatively rare in children, or occurs only in those that are robust and plethoric. The more common forms of cerebral inflammation to which the child is subject, present, in general, a low or insidious character; they appear to partake much of the nature of scrofulous inflammation, as seen elsewhere, and indeed most frequently occur in strumous children. It is not easy to determine what the peculiarity is; but we agree with Dr. Cheyne, that hydrocephalus consists, in many instances, of "a diseased action of a peculiar kind, but of what, we can as little explain, as we can the nature of scrofulous action." One peculiarity in this form of morbid action is, its tendency to throw out fluid, or cause effusion; and hence the name hydrocephalus or dropsy of the brain. This effusion of water, however, is not essential to the symptoms which are usually looked upon as constituting a case of hydrocephalus: for all these may be present, without water being effused; or water may be found, where the chief of these were wanting. The symptoms seem to depend truly on that morbid condition of the brain, or its membranes, which gives rise to the effusion; but the latter is only an accidental, though frequent, consequence of this morbid action. Effusion may even be found where no inflammation had existed; or be induced by debility, or the exhaustion brought on by excessive evacuations. The more slow the disease is, and the less it partakes of the acute inflammatory character, the more certainly, in general, will water be effused, and the greater will be the quantity. The cause, then, why effusion of fluid is so much more common in the child than in the adult, appears to be the greater liability to this peculiar form of inflammatory action, and the greater latitude that there is given to the effusion of fluid, in consequence of the expansile properties possessed in the young cranium. The substance of the brain may be the seat of morbid action, leading to ramollissement and effusion, with disease of the membranes; or the softening of the brain may result from the disease going on in the membranes, when this is protracted and leads to effusion.* The arachnoid membrane is that usually affected; and it has been remarked by Martinet, that the arachnoid at the base of the brain is more frequently the seat of inflammatory action in the child—that of the convex surface in adults. Each of these varieties is distinguished by particular symptoms.

The connection between hydrocephalus and strumous affections has been long remarked, and Dr. Gerhard, of Philadelphia, points out a peculiar form of the disease, which he denominates *tubercular*, and has accurately described in two valuable papers, published in the 13th and 14th volumes of the American Journal of the Medical Sciences. M. Ruz has farther stated, that in several cases in which tubercles were found in the cerebrum or cerebellum, he detected small, white, semi-transparent granulations in the arachnoid membrane, especially at the base of the brain; and similar granules were discovered in other situations, as the peritoneum, pleura, &c. &c., while tubercles were uniformly present in the lungs.

The curability of hydrocephalus seems to depend much on the nature of the morbid action giving rise to the symptoms,—the acute inflammatory form of the disease being amenable to active depletion; while in the low, or strumous variety, depletion is ill-borne, and recovery uncertain. That described as the tubercular appears to be the most hopeless form of this species of the disease.

As morbid anatomy has not yet enabled us perfectly to clear up this subject, or to determine with certainty, by the symptoms, the precise lesion of the brain present, we shall still treat of hydrocephalus under its ancient appellation,—not forgetting, however, that it is not a mere passive dropsy, as was formerly thought; and recollecting that it is not always an acute inflammatory disease, as has been more recently taught.

HYDROCEPHALUS may be acute or chronic; and its progress is usually marked by certain alterations in the condition of the patient and the symptoms, which have led to its division into stages or periods. These are often well marked; but we must not always expect to find them distinctly formed. It has been attempted to connect the peculiarities of the symptoms in each stage, with the particular pathological condition supposed then to exist; and the state of the nervous or vascular systems is that usually taken as the type of each period. Thus we have, first, the period of increased sensibility of Cheyne, with the quick pulse of Whytt; or the period of inflammation of Gölis. Then we have the second stage, or that of diminished sensibility, according to Cheyne, with the slow, irregular pulse of Whytt; and looked upon as the period of effusion by Gölis. Again, we have the last stage, characterised by the pulse rising once more, and becoming rapid, but feeble; when convulsions or palsy attend.

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* Abercrombie seems to regard an inflammatory affection of the central portions of the brain, ending generally in softening of its substance, as the essential lesion in hydrocephalus, whether there be effusion or not. Lallemand pretends to distinguish between the affection of the substance of the brain and that of the membranes; but this can be attempted only in the early stages of the two affections—which may, however, exist together; while the direct communication by blood-vessels is such, that an affection of either structure may, from the commencement, give rise to symptoms connected with the other.

Differences are also to be observed in the mode in which hydrocephalus makes its attack; this is modified by the form in which the complaint presents itself, and the condition of the patient at the time. In healthy children, we sometimes see hydrocephalus set in with violence,—there being sudden fever, or severe convulsions, at the onset; the disease presenting a highly inflammatory character. This form of attack, however, is that less frequently met with; and hydrocephalus most commonly commences in a gradual or obscure manner. The premonitory symptoms are not sufficiently peculiar to command attention: but generally the digestive organs are observed to be deranged in a particular manner, and the nervous system much disturbed; and these conditions will not be found to yield to the use of purgatives, or other medicines, as readily as might be at first expected.

During the progress of febrile disorders, or after the occurrence of one of the exanthemata, particularly scarlatina, hydrocephalus is liable to make its attack in a secondary form,—approaching insidiously during the progress of the complaint, or appearing suddenly on any rapid subsidence of the symptoms. During the progress, then, of any infantile fever, or protracted disease, as scrofulous affections, hooping cough, painful dentition, or disorders of the bowels, as before observed, we should be on the watch for cerebral symptoms; and on any unusual irritability of the little patient, particularly an irritable state of the stomach, not otherwise to be accounted for, we should apprehend that the head was becoming engaged, and narrowly watch all the symptoms. In such cases, the symptoms of the early stage are often absent; and convulsions or palsy, will be the first unequivocal sign of an affection of the head.

Symptoms.—In the most acute, and therefore best marked form of hydrocephalus, the symptoms indicative of cerebral disease set in with severity after a short period of previous indisposition, which is very liable to be overlooked. The child is seized with severe pain in the head, which usually appears to be referred to the forehead or temples; the head is hot, and face red; the vessels are distended, and throbbing; there are frequent flushings; the eye is unusually brilliant;* light is disagreeable, and noise distressing; the child starts on the slightest touch or sound; and there is increased sensibility of the whole nervous system.

The fever sets in violently and suddenly, the intermissions being very short and irregular; the pulse is, at first, full and rapid; the breathing is hurried or oppressed. Much derangement of the digestive organs is present, the bowels being obstinately costive, and the discharges very unnatural, when obtained, which it is, in general, very difficult to effect, even by the strongest purgatives. The urine is usually scanty, or suppressed, and may be white. The state of the stomach, in particular, is characteristic of the disease; the irritability is excessive and peculiar, vomiting being induced by any movement, especially an attempt to sit upright, while there are no corresponding symptoms of gastric derangement; for though the appetite is gone, the thirst may not be remarkable; and the tongue is white and furred, but not red or pointed. Pain in the abdomen usually attends the complaint, and some tenderness on pressure over the epigastrium; but these fall far short of what indicate an abdominal inflammation.

The complaints made of the head, and the expression of the countenance, dispel all doubts as to the nature of the case. Pain in the head is loudly complained of, or the child (when unable to speak) clasps its hands round the head, while occasionally the screams are frantic; and alternately with these, there is a heaviness, or unwillingness to be stirred. During the periods when there is absence of the look of pain, or terror, that accompanies the more violent symptoms, the eye appears to be set, or vacant, with that look of dejection that belongs so peculiarly to cerebral disease. This is the form of hydrocephalus that runs its course most rapidly, but regularly; and in it the stages are most distinctly marked. The pulse, from having been strong and quick, becomes slow, weak, and irregular in its beats, or unequal: the great slowness and inequality now become remarkable; but it is liable to be accelerated on any motion. Gölis speaks of the pulse as being sometimes slow in the first instance; but this is rare in the acute form of the complaint, although in the low or strumous variety, the pulse is at first almost always slow. Corresponding alterations take place in the other symptoms. Pain in the head is less complained of during the second stage; but this is not always so; and there still continue occasional screams, or exclamations of suffering. The head droops or sinks upon the pillow, and is with difficulty raised; and the fontanelle is often found at this period full or prominent. Heaviness or torpor prevails: the child lies in a comatose state, with its eyes half-closed; and a slight paralysis of one of the upper eye-lids is often present. The pupils are dilated or immovable; and strabismus not unfrequently attends. An oscillatory condition of the pupil may precede this state, with impaired or double vision. We have seen the pupil dilate on exposure to the light, and contract on its removal. The sickness of stomach now diminishes, or may be altogether absent, and some appetite occasionally returns; but the child emaciates remarkably, the bowels continue obstinately costive, and there is incessant picking of the mouth and nose. The hands, which are often raised to the head, are observed to be tremulous in their movements; the child moans; and the state of debility is indicated by frequent sighing.

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* Dr. Armstrong, in his Lectures says there is a "combined expression of physical brightness and intellectual dullness in the eye;" and describes the "intercourse" which naturally subsists between the eye of the infant and that of the mother or nurse, as being in this case lost. He lays much stress on these circumstances, as indicative of cerebral inflammation in the child.

This condition may continue for one, or even two weeks; but the symptoms of the third stage now begin to manifest themselves, and add new distress to the scene.

Convulsions in all forms and degrees, may be present, from the most violent general convulsion to mere spasmodic twitching of the muscles of the face, or vibratory motions of the eye-balls. A rigid state of the muscles may be present; and violent spasms of one side may continue to recur after the other has become paralyzed; or the child will wave one hand in the air, or toss one leg about, while the other limbs lie immovable. There is frequent grinding of the teeth, and movement of the lips and tongue. The whole appearance indicates extreme distress. The child lies moaning, or raving, yet insensible. The eyes are turned upwards, and constantly fixed in that position, (a most alarming symptom;) or the half-uncovered eye-ball discloses a conjunctiva dully suffused, the pupil dilated, and the cornea dim and coated with a filmy matter. The skin is partially covered with profuse perspiration, while in other parts it is dry or burning hot. The pulse becomes excessively rapid, more so than in almost any other disease; but this apparent effort at re-action soon gives way: the pulse grows gradually weaker; the breathing becomes unequal; and the coma more profound. The child lies in a state of utter prostration, the abdomen being drawn in, and the limbs relaxed; and dies in a state of collapse, or a violent convulsion precedes death. The duration of this final or third stage is very variable, occasionally lasting for a week, or even fortnight; at times not enduring for more than a few hours.

The more common form of hydrocephalus is much less acute, and therefore the symptoms less strongly marked. Great lassitude, languor, and irritability first begin to give character to the child's indisposition. It is restless; dislikes light or noise; is very averse to exertion; totters in its walk, or drags one limb after it: and is soon fatigued in an attempt to sit up for any length of time, which it is unable to do. There is heat of head, and pain; the pain being occasionally complained of in the eyes or back of the neck, and alternating with pains in the limbs or abdomen. There is some fever; the conjunctiva of the eye is injected, or the pupil contracted. There is grinding of the teeth during sleep, and starting or screaming on being awakened; but the intellect seems to be little disturbed; for the child, though unwilling to be spoken to, replies correctly to questions asked. A sudden stammering, or faltering in the use of a particular word, is always to be looked on as a serious symptom. The peculiar irritability of stomach, and derangement of bowels before noticed, are present; and the somnolency, deep sighing, the peevish shrill scream,* and peculiar expression of the countenance, so characteristic of hydrocephalus, complete the picture. The disease passes through its stages as before described, but not always in a marked manner: in particular, the pulse may be invariably fast throughout. The urine, which is scanty or suppressed, occasionally causes distress in passing. We should recollect that it may be retained, and an aggravation of the cerebral symptoms be induced by an over-distended state of the bladder. We have seen some cases in which a very copious flow of urine had preceded the establishment of the disease.

In that variety of the complaint, described as the tubercular, but which is nothing more than the strumous variety in its most exquisite form, the symptoms appear to observe a very uniform order in their course; beginning with vomiting, then head-ache, and constipation. Somnolency is succeeded by delirium; or they alternate with each other—coma now sets in, and convulsions follow. The expression of the countenance is very peculiar, and the respiration is observed to be accompanied by a kind of sigh in expiration. The pulse, which is at first slow, becomes very much accelerated before death.

A peculiar circumstance in the progress of hydrocephalus, and one well worthy of note, is the occasional remission or total disappearance of all alarming symptoms for a short period towards the conclusion of the disease, so that a child recovers the use of its speech and senses, noticing objects, and asking or answering questions; but this remission (or "lighting up before death," as the nurses express it), is of short duration, a deeper state of insensibility than before sets in, and the expectations of recovery which the inexperienced or over-sanguine may have held out, are for ever put an end to.

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* The peculiarity of this cry seems to have been first pointed out by M. Coindet, of Geneva, by whom it was assigned as evidence of effusion having taken place; but erroneously.

Chronic Hydrocephalus.—The head gradually enlarges in size in this form of the disease; and the head-ache, fever, and other symptoms which belonged to the more active stage subside; or, as more generally happens, the disease arises insensibly without any antecedent acute stage. The head sometimes attains an immense magnitude—the sutures being separated, the fontanelles transparent and full, with a distinct fluctuation perceptible on pressure, while the face retains its natural size, and gives to the physiogomy a very peculiar expression. In a few instances, instead of general enlargement of the head, a fluctuating tumor may be felt near the occiput. This is surrounded by the investments of the brain, so that upon pressure the fluid compresses the cerebral substance, and thus gives rise to coma or convulsions. The senses become blunted, and the intellectual powers impaired; or altogether suppressed, as the disease advances. Muscular power is much enfeebled, so that the patient is unwilling or unable to move about; and the enormously distended head can no longer be supported, but droops upon the shoulder or the chest. This gradual diminution in the sensitive and locomotive powers, while the head increases in size, marks the progress of chronic hydrocephalus in the child after it has passed the first year of its age. Convulsions not unfrequently occur, and several of the other symptoms enumerated under acute hydrocephalus, but in a mitigated form. A variety of hydrocephalus, analogous to the chronic, may exist in the infant at birth, constituting the *congenital hydrocephalus* of authors. In these cases, the head is occasionally so much enlarged as to afford a serious impediment to delivery.

In ARACHNITIS, *confined to the base of the brain*, there is fever, general languor, and depression. Pain is complained of in the forehead or temples; but the intellectual faculties are undisturbed. The head is hot; the child moves it from side to side or sinks it heavily on the pillow. Vomiting attends, and more or less of drowsiness is present. Spasm now begins to appear; and in this affection, in particular, generally affects the mouth, the eyes or the upper extremities. Frequent working of the tongue and lips, or motions of the lower jaw *(machonnement)* are observed; or the hands and arms are convulsed at intervals, or for a long time together. A sudden, and often complete loss of the intellectual powers and senses, as well as of the general sensibility, at the same time occurs. We have often to notice in this affection, as we did in hydrocephalus, the occurrence of remarkable, but deceitful remissions of the symptoms. But convulsions again occur; coma sets in; the pupils become dilated; the pulse very slow; and a state of complete relaxation of the limbs precedes death.

This affection is often accompanied by *spinal arachnitis:* which we judge of by the stiffness of the muscles at the back of the neck, and the pain complained of in this part. The head is often observed to be retracted, or moved from side to side: the former circumstance being considered as indicative of that part of the arachnoid which covers the pons Varolii being in particular implicated in the disease; the latter, that the inflammation has attacked the upper part of the medulla oblongata.

Children are not exempt from *arachnitis of the upper surface of the brain*, though this affection occurs less frequently with them than the other variety. In one remarkable case which we witnessed, a thick, tenacious layer of lymph was effused on the arachnoid of the anterior lobes of the brain. The child had been seized suddenly with severe convulsions; the head continued hot, face red, and eyes suffused; high fever followed, with delirium, violence of temper, general convulsive movements of the limbs, coma, paralysis, and death. on the fourth day. A brother of this child was seized in a similar manner, when about the age of the former patient; but was seen early, and under the use of active depletion, the disease was arrested in its first stage.

Pathology.—After the pathological remarks made at the beginning of this section, much does not remain to be said of the morbid conditions of the brain connected with hydrocephalus. These will vary according to the form and duration of the complaint. If the disease run a rapid course, and be of the acute inflammatory kind, little or no fluid may be effused; and even the membranes may appear to be only slightly injected. In other cases, where water is not found, it appears to have been absorbed before death, as the ventricles are found dilated, though empty; and we know that such at times occurs with other dropsical effusions. The water effused in the very rapid attack already alluded to (p. 321), is usually found to be turbid or whey-like. Flocculi of lymph are occasionally seen in the serum; but in general, the water is limpid, of a light straw color, and not exceeding a few ounces in quantity. The average extent of the effusion may be estimated at four or five ounces; occasionally it amounts to seven or eight, but in some cases of chronic hydrocephalus to much more, the fluid being generally of a deep citron color. The mere circumstance of a small quantity of serum being found in the ventricles after death, is not to be looked on as a proof that hydrocephalus had existed during life; for such usually takes place previous to death in cases of protracted illness, or may be induced by the very means taken to avert it; as we doubt not, we have seen done by excessive depletion injudiciously employed in the cerebral affections of children. The fluid effused in hydrocephalus is usually situated in the lateral ventricles, which are in consequence distended, the dilation being most remarkable towards the digital cavity. The foramen is often considerably enlarged; but, in general, little fluid is found in the third or fourth ventricles. This effusion into the ventricles constitutes the hydrocephalus internus of the old writers—an unnecessary distinction, as it does not appear to have been established that hydrocephalus externus exists. The serum effused in hydrocephalus is often not coagulable by the action of heat or acids, or only very slightly so; but this is not uniformly the case. In consequence of the distension of the cerebral substance, consequent on the effusion, we find the superior convolutions of the brain much flattened and depressed, or it may be stretched into a thin covering, a sense of fluctuation being perceptible on removing the skull. The vessels on the surface of the brain may be in a state of congestion, or the pia mater injected with blood; but this is not a frequent appearance. The arachnoid on the convex surface is usually dry; but beneath that at the base of the brain, fluid is often found effused. When this is the seat of morbid action, the arachnoid will be dull, opaque, or covered with layers or granules of lymph; but that lining the ventricles is often unchanged, though much fluid be effused. Laennec speaks of extensive tubercular deposition throughout the brain; and Dr. Gerhard describes tubercular deposition on the membranes. We have certainly seen some cases of this description. The substance of the brain in acute hydrocephalus is generally softer than natural, except in some cases which run a very rapid course. Remolissement is most generally found in the central parts of the brain, in the fornix, corpus callosum, or the digital cavity. In chronic hydrocephalus there is incomplete ossification of the bones, with separation of the sutures, or in some cases total absence of bony matter; in other cases, again, especially some that were congenital, a great expansion of the cranial bones has been observed.

Of the secondary lesions, or complications, found after death in hydrocephalus, a morbid condition of the intestinal mucous membrane, or the liver, has been most frequently remarked; and this coincides with the fact already noticed, of hydrocephalus originating so often in derangement or disorders of the digestive organs. The lungs, also, are not unfrequently found inflamed.

Diagnosis.—The circumstances most characteristic of this disease, and which distinguish it best from others, are,—the particular expression of countenance; the peculiar cry or scream; the variability and successive changes in the character of the pulse; the irritability of the stomach; the costive state of the bowels, with a peculiar green appearance of the evacuations when obtained; and the suppression of urine,—cerebral excitement being succeeded by convulsions, coma, or paralysis; all which signs have been dwelt upon in describing the symptoms of the disease. The occurrence of one or more of these symptoms, during the existence of infantile fevers, should lead us to apprehend hydrocephalus, which may occur either as a sequel to any of them, or commence, itself, with symptoms so similar, that the disease may be established before its existence is suspected,—there being, in fact, often no means of accurately distinguishing between simple remittent fever and the first stage of hydrocephalus. The same may be said of those disorders of the cerebral system which we have described under the name of functional; for the establishment of a diagnosis between any of those and hydrocephalus, we must refer to our detail of the symptoms of both, and recommend a careful collation and comparison of these in every individual case. We must often, however, expect great difficulty in ascertaining, in any particular instance, whether convulsions, or symptoms of irritation of the brain, or of the hydrencephaloid disease, are purely functional, or must be referred to organic lesion. Whenever doubt exists, it will probably be encountering the least hazard to consider that the latter is present.

The symptoms of chronic hydrocephalus are so well marked, as sufficiently to distinguish it from other diseases. With respect to the other varieties of the complaint, as the various forms of arachnitis, &c., their diagnosis from each other must be attempted, by a comparison of all their symptoms; a matter always of much difficulty.

The *Prognosis* must be in all cases guarded, but, even in those apparently the worst, need not be hopeless. We have seen that the most alarming symptoms may exist, without these being certain proof of any irreparable lesion; and, notwithstanding such symptoms, recovery may take place. When the cerebral symptoms have come on insidiously, however, at the sequel of a previous disease, in a child of a strumous habit, or one having a family predisposition to the disorder, much danger is to be apprehended, and the result is most frequently fatal. The more acute the inflammation, on the contrary, the greater in general is the chance of cure, and the better is active depletion borne,—such cases usually occurring in healthy children. Recovery may also be generally effected, when the disease sets in subsequently to scarlatina, if we are prepared to meet the case, as the symptoms are often very sudden and acute. That form of the disease which is connected with inflammation of the arachnoid at the base of the brain is very dangerous, as alterations of structure, and the growth of false membranes, are so liable to occur. That variety of chronic hydrocephalus which succeeds to an acute attack, is almost always fatal; but its more common form, when once established, does not seem of itself directly to shorten life,—the patient generally dying of some other disease: Gölis thinks this form of the complaint may frequently be cured. When coma, convulsions, or delirium, attend upon chronic hydrocephalus, or an acute attack supervenes, the disease generally proves fatal. Congenital hydrocephalus is almost invariably incurable.

The condition of the secretions, and the pulse serve, in particular, to guide us as to our prognosis in any particular case. When the bowels become easily moved, while the evacuations grow natural, the flow of urine increases, or a copious warm perspiration breaks out, we have very favorable signs; and with these, some running at the nose is occasionally observed. As to the pulse, Cheyne says, that 'so long as it continues steady, while the breathing is natural, we should not be deterred by other symptoms, however formidable, from entertaining expectations of recovery.' When the pulse falls suddenly, however, and remains slow, until it again rises with extraordinary rapidity, while the breathing becomes unequal and irregular, we augur very unfavorably, seeing that the case runs on through the usual stages. We must be careful to distinguish between the gradual diminution of the pulse, indicative of a subsidence of fever, and this sudden fall or protracted slowness connected with the second stage of the disease. As careful must we be to distinguish between those deceitful and temporary remissions in the symptoms already alluded to, and the protracted improvement of some days' duration, which we may rely upon as indicative of recovery. So long, however, as the pupil continues dilated, or is very slow to contract, we must dread relapse, even though recovery may have apparently taken place. The spontaneous occurrence of a cutaneous eruption has, in some instances appeared to expedite recovery, in protracted cases; but a particular kind of eruption, consisting of almost imperceptible vesicles, is occasionally observed to occur on the face or upper parts of the body, towards the end of the disease, and is be looked upon as an unfavorable sign. Continental writers mention this eruption as a constant attendant on hydrocephalus, but it is seldom noticed in this country.

Treatment.—In undertaking the treatment of a case of hydrocephalus, we must be guided by the form of the complaint, and the stage or period at which we see it. In the acute attack, when recently seen, our treatment must be actively and perseveringly antiphlogistic. Blood-letting, purging, and cold applications to the head, with subsequently the use of counter-irritation, constitute our chief resources, and their full employment will often prove successful. In the low form of hydrocephalus, or when the disease is chronic, active depletion is not admissible, though the moderate use of antiphlogistic measures may be occasionally called for; but we cannot expect here to effect a cure, merely by active depletion, as may be done in the other form of the complaint. Leeches occasionally, and in all cases cold to the head, followed by active counter-irritation, while we keep the bowels open, or try to improve the secretions by alternative doses of mercury, appear to be the means on which most reliance is to be placed in these forms of the complaint; while we at the same time take care to support the strength by a sufficient supply of light but nutritious food.

Blood-letting should be carried to such an extent, when first employed in the acute variety, as to make a decided impression: and general blood-letting may require to be repeated, but the substitution of leeches will frequently answer. In the less acute or more protracted form of the disease, a frequent repetition of the leeches may be required; although the application of a large number on any one occasion would not be advisable. When the hydrocephalic symptoms occur during the existence of disease of the lungs, or particularly of the digestive organs, the application of leeches over the seat of the original disorder will often more effectually relieve the head, than if they were applied directly thereto.

Mercury has been employed specifically in the treatment of hydrocephalus, but its use has been much overrated. In the acute form, the constitutional action of mercury, after blood-letting, has certainly aided in cutting short the disease, as we see occur in other internal inflammations; but in the low or strumous variety of the complaint, the production of salivation does not appear to exercise any special influence in controlling the symptoms; for though these may be mitigated thereby, the case will generally proceed to a fatal termination. Small doses of calomel, given so as to act as an alterative, appear to effect all the good that can be looked for from mercury, in this form of the complaint; which good seems to arise from the improvement thus effected in the condition of the digestive organs.

In chronic hydrocephalus, Gölis regards this plan of treatment, aided by counter-irritants to the head, as the best that can be pursued, and states that it is often successful; but condemns the employment of the large doses of mercury commonly in use. Corrosive sublimate has been occasionly employed with success.

In either of these forms of hydrocephalus, however, and even in the second stage of the acute variety, we much prefer the use of iodine to that of mercury, and have seen some cases of its signal success. *Iodine*, to be effectual, however, must be largely employed, both internally and externally. The combination of iodine with mercury, in the proto-ioduret, would seem to present particular advantages. The ointment of bin-iodide of mercury appears eligible for producing speedy and effectual irritation over the scalp, while it at the same time has a tendency to affect the constitution, so as to induce salivation.

The tonic or stimulant properties of iodine have also their advantage in the treatment of hydrocephalus, under these circumstances; and its diuretic power may enable us to dispense with digitalis, squill, &c. &c.—once of much repute, but little to be relied on in the treatment of this disease.

Digitalis is an unmanageable medicine in affections of the head, and its diuretic powers particularly uncertain in hydrocephalus. It should never be employed in the acute form or earlier stages of the disorder; but in chronic hydrocephalus, or that variety occurring in connection with anasarca after scarlet fever, frictions with tincture of digitalis, or squill, extensively applied over the surface of the body, appear to have been practised on the Continent with some success.

Purgatives are of great service in the early stages of hydrocephalus, especially when presented in the acute form; but their employment requires judgment and caution.

In general it is very difficult to move the bowels in this complaint, and the most active. purgatives may be required; but, in consequence of the irritable state of the stomach, we shall often be obliged to resort to enemata to effect this purpose. Purgatives after blood-letting, however, will often produce free evacuations although they had before failed to move the bowels. When irritation of the intestinal mucous membrane is present, we must be careful to avoid active aperients, and rest satisfied with mild enemata.

Antimonials will be found of much service in mitigating increased cerebral action, and have been used with advantage in the early stage of hydrocephalus by Cheyne and Mills. Vomiting, should, however, be guarded against; but Laennec has proved that *tolerance* of tartar emetic can be attained in affections of the head. James's powder is a more manageable preparation, and may be given alone, or combined with calomel or cathartics.

Opium, employed after blood-letting and purging, alone, or in combination with antimony or ipecacuan (as Dover's powder), is often of great service, particularly in the second, or even third stage of the disorder, by lessening the frequency of the convulsions, allaying pain, and even rendering the pulse more full, and less irregular. The use of opium, when once commenced, should not be suddenly discontinued; but when contraction of the pupil ensues from its employment, this is to be looked on as a sign that the use of the medicine has been carried far enough; nor should we attempt to control the convulsions sometimes attendant on the inflammatory stage, by opium, independently of antiphlogistic means.

During the progress of hydrocephalus, we must not forget the necessity for supporting the strength; and in the advanced stages, light bitters, tonics, or even stimulants, may be required. Strong coffee or tea will at times dissipate coma, rouse the circulation, and restore warmth to the skin. Direct stimulants, as ammonia, ether, camphor, or musk, will in some cases be required; and particular efficacy has been assigned by some practitioners to certain medicines, as the calamus aromaticus, serpentaria root, arnica montana, &c.; but their utility is not sufficiently established. A large blister applied over the head is often of great service at this period.

When distinct intermissions are to be noticed in the progress of the complaint, indicated by alternations in the heat, and chills of the surface, flushings and paleness of the face, with excitement and depression of the animal powers, M. Piorry specially recommends the use of Peruvian bark, given in the form of enemata, and to the extent of from two scruples to two drachms at a time. The period for exhibiting the bark is during the time of intermission, when the face is pale and system low; and the bark in substance was found to be much preferable to quinine.

In the treatment of chronic hydrocephalus, principal attention must be paid to support the strength, while we at the same time improve the general health. Counter-irritation must be freely and frequently applied to the head, and setons or issues inserted in the neck. Warm baths* are of much assistance; and we may avail ourselves of the alterative action of mercury, or the specific influence of iodine, in attempting to cause absorption of the effused fluid. Antiphlogistic measures may be occasionally necessary; but should never be intemperately employed. Compression of the head has been used to assist the action of the absorbents in diminishing the effused fluid; or this has been in some cases evacuated by puncture, tapping the head having been resorted to with success in a few instances.*

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* In Continental practice the use of medicated baths is much relied on in the treatment of chronic hydrocephalus. Alkaline solutions seem to be preferred by Gölis; but Recamier and Andrieux recommend tartar emetic (one ounce gradually

To prevent the occurrence of hydrocephalus in children predisposed thereto, we should place them in a dry, warm, and elevated situation; avoid all causes of mental excitement, in particular early or excessive exercise of the intellectual faculties; and as medical measures, pay especial attention to the state of the bowels and regulation of the diet. An issue kept open in the arm or neck, during childhood, has undoubtedly exercised a control in averting hydrocephalus in families predisposed to the disease.

CHAPTER XII.

ERUPTIVE FEVERS.—(EXANTHEMATA.)

I.—MEASLES.—(RUBEOLA; MORBILLI.)

This exanthem consists in a fever, in which the mucous membrane of the air passages is chiefly affected, and which, after about three days' duration, results in an eruption of a red rash over the surface of the body.

Symptoms.—Measles commences with the ordinary signs of fever—languor, shivering, heat of skin, thirst; and at the commencement cannot be distinguished from common catarrh, or other febrile affection. As the disease advances, the catarrhal symptoms become very distinct; there is dry, hoarse cough (often much resembling that of croup); frequent sneezing; suffused and watering eyes; swollen and feverish face; alternations of heat and chills; quick pulse; thirst, and scanty

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increased to four or five in each pailful of water), which appears, when thus employed, to cause a copious flow of urine, the patient growing thin, and the size of the head at the same time diminishing.

* Cases are recorded by Dr. Conquest, see Lancet for 1830; by Mr. Lizars, in Edin Med. and Surg. Jour.; by Dr. Vose, in the Med. Chir. Tran. vol. ix.; and others.

secretion of urine; with hot, dry skin. There is occasionally vomiting or purging, but sometimes constipation of the bowels. These symptoms occur, with greater or lesser severity, in different cases; being sometimes very slight, and scarcely attracting attention; at others, exceedingly severe,—being accompanied with delirium; and the affection of the lungs amounting to actual inflammation. There is usually, towards evening, an exacerbation of all the febrile conditions.

After the symptoms, enumerated, have continued for three or four, or in some cases for so many as seven or eight days, the eruption begins to appear in the form of round, red dots—showing first upon the forehead and face, and subsequently upon the body and limbs. On the fifth day, the whole surface is usually covered with the eruption; which begins to decline on the face, on the sixth, and has usually disappeared altogether upon the tenth day from the commencement of the fever, or sixth from its own first appearance. The eruption is not confined to the skin; but extends also to the mucous membrane, as we may observe by inspecting the fauces and mouth, upon which, reddish, slightly elevated spots will be discernible about the fourth or fifth days. The rash consists at first of separate elevations, giving a sensation of hardness to the fingers; subsequently, these run together into raised patches, of an irregular or semi-circular form. These patches are in healthy measles of a lightish red color, and contrast strongly with the sound skin between them, which retains nearly its natural hue. At the termination of the disease, the cuticle covering these elevations becomes detached in the form of scales; and during the desquamation, a troublesome itching is occasioned. Billard describes the eruption of measles as not feeling elevated above the surface, which is decidedly contrary to the fact.*

Variations from the course of the eruption, as we have just described it, may occasionally occur; e. g., it may be accelerated or retarded in its course, or be combined with an eruption of miliary vesicles. In favorable cases, the violence of the fever abates as soon as the eruption appears; but frequently the cough will continue without much fever for a considerable period.

Pathology.—With respect to the cause and intimate nature of measles, or indeed of any of the other diseases included in this chapter, we are in a state of total ignorance; and yet, to the philosophical physician, they are the most remarkable of any to which the human body is liable. They are, however, well ascertained to be subject to certain definite laws, to a degree of strictness unknown in any other affection, and which almost confirms to them the character of natural and necessary movements in the system, rather than of accidental diseases.

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* Traité des Maladies des Enfans, p. 102. Paris, 1828.

These laws are: first, that the proper period for the occurrence of the exanthemata is in the commencement of life—a rule to which we certainly meet with exceptions; but not to an amount at all calculated to weaken the generality of its application: secondly, that they occur but once in the same individual; and to this the exceptions are extremely rare, although not totally wanting: thirdly, that they run a certain definite course as to order of symptoms and duration, to occasion any deviation from which, a very considerable disturbing force is required: fourthly, that they afford the only *certain* examples of the propagation of disease by contagion; but that, at the same time, they are in their own essence decidedly of an epidemic nature,—occurring at certain seasons of the year, usually in spring and the commencement of summer; and at those times often arising in communities, independently of any traceable contagion: fifthly, they have the power of suspending each other's action, although apparently owning some degree of relationship or connection—thus epidemics of measles and small pox commonly occur simultaneously; but the progress of small pox, after it has been received into the constitution, may be suspended by an invasion of measles, and may subsequently resume its course after the latter has terminated; and *vice versa.*

A consideration of the foregoing laws, whose existence is universally admitted, cannot but strongly force upon us the conviction, that in them we might hope to find some *principia* for the establishment of a true and comprehensive pathology. In the exanthemata, for example, we have instances of diseases occurring, we may say with certainty, to all individuals; and thence affording the presumption that by their operation a certain necessary change is effected in the system. Their usual occurrence at certain seasons, and their occasional suspension of each other, favor the same presumption; as well as the immunity from future attacks conferred by them. The capability of being communicated by inoculation, belonging to some of them, also gives the means of experimenting upon disease, and so testing conclusions at which we might arrive by other channels; and we have also in them an opportunity, which is to be found under no other circumstances, of investigating the subject of contagion.

To do more than hint at the foregoing views, would be, at present, out of place; but our notion of their importance, induces us to express regret, that the (perhaps too complete) abandonment of the doctrines of the humoralists, by leading to an almost exclusive consideration of the effects rather than of the working of disease, has somewhat diverted attention from the study of the exanthematous fevers.

In enumerating the laws just stated, we have recorded nearly all that is known respecting the pathology of these affections. A latent period probably exists between the time of receiving the infection and the appearance of the fever; but the duration of this is not well ascertained, and is differently stated by authors—the average is probably about eight or ten days.

Diagnosis.—Measles is to be distinguished by the regular occurrence of the stages, and of the eruption, as we have described them. During the febrile stage, the disease can only be guessed at from collateral circumstances,—as exposure to infection, or the existence of an epidemic. The eruption must be discriminated by its peculiar characters, and by its occurring in connection with the febrile stage. The varieties of strophulus or red gum, have been sometimes mistaken for measles; but may be recognized by the absence of fever and catarrhal symptoms.

Prognosis.—Measles, by itself, is not a dangerous disease: but in forming a prognosis, we must take into account the liability to complication with other diseases, as inflammation of the lungs or brain; and also the sequelæ likely to remain in the form of ophthalmia, scrofula, diarrhœa, or phthisis. These, though not properly parts of the disease, are so likely to be called into action in patients predisposed to them, that we should always watch measles jealously, and speak guardedly of its termination: we must also be influenced in our opinion by the character of the prevailing epidemic; which may at times assume even a malignant cast, and at others be extraordinarily mild. These circumstances, and the state of the patient's general health at the period of receiving the infection, must all be taken into account in forming our prognosis.

Treatment.—In simple measles, the treatment must be rather preventive than remedial, and should be directed to the allowing of the disease to run its course without interruption or attempts at acceleration. Perhaps we cannot have a better plan than that adopted by Sydenham with the children of "the most virtuous Countess of Salisbury," viz.: "I ordered them to keep their beds two or three days before the eruption, that the blood, according to its own genius, might cast out through the pores the particles that were easily separated, which occasioned the disease; but I did not permit that they should have any more clothes on, or fire, than they used to have when they were well. I forbad the eating of flesh, and allowed them oatmeal and barley broths, and now and then a roasted apple; and for their drink, small beer, and milk boiled with three parts of water; and when the cough was troublesome, as was usual, I prescribed a pectoral ptisan,* to be taken often."† So far as positive treatment is required, little more is necessary. If the bowels be confined, a gentle aperient, (as No. 27 or 28, p. 161,) may be administered; but in ordinary cases, no active purgatives are needed. Every thing heating should be avoided; and in this country, as in the days of Sydenham, particular attention is required, in order to prevent the attendants from giving ardent spirits and stimulant drugs, with the view of "striking out the eruption, and driving the disease from the heart." The tenderness of the eyes belonging to the disease will, probably, make light disagreeable to the patient; and if so, the room should be partially darkened, but at the same time free ventilation should be provided for. When there is much heat of surface before the eruption has appeared, we have found great advantage from sponging the body with warm vinegar and water; and the same process will also materially relieve the disagreeable itching attendant upon the desquamation of the cuticle at the close of the disease.

So much for the management of simple measles. Anxious attention must, however, be directed towards any symptoms of local inflammation which may arise. The state of the respiration must be carefully watched, and the chest regularly examined; and should any symptoms of bronchitis or pneumonia be discovered, very active treatment, perhaps even a repeated use of the lancet, may be required. Any symptoms of an attack in the head, as head-ache, remarkable intolerance of light, or convulsions, must also be narrowly looked after, and treated according to the principles laid down in the chapter on those affections. Local inflammations and congestions commonly appear as a kind of metastasis, suddenly setting in simultaneously with a sudden and premature disappearance, or partial fading of the eruption; and when such is the case, an important part of the treatment must be directed to the bringing out again of the rash. We have occasionally seen this effected, and the local affection quickly relieved, by placing the lower extremities and hips of the child, for five or ten minutes, in a bath of as high a temperature as could be borne. The partial hot bath, when used in this way, will almost always be found of service; but we must be very cautious in attempting to recal the eruption by the use of any internal stimulants. Most commonly these are contra-indicated by the existence of active inflammation; and in such cases the proper plan is the reduction of the latter by suitable depletion.

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* For a suitable expectorant mixture, see p. 145.

† Sydenham. Pechey's translation. London, 1734.

It is not to be forgotten, however, that cases do occur in which the retrocession of the rash is occasioned by debility, either belonging to the type of the prevailing epidemic, or occurring accidentally in an individual patient. In such a case, we shall find the child cold and stupid, with pallid, shrunken features, and perhaps petechiæ. When the chest is the seat of the metastasis, our diagnosis will be much aided by the employment of auscultation; but it is often an extremely difficult point to decide as to whether the state of depression, in which we may find a child, be dependent upon inflammatory congestion, or debility. These are matters, however, which frequently embarrass the most experienced physician, and can only be learned by long-continued personal observation of disease.

When debility is obviously present, wine, and stimulants, (as the mixture No. 6, p. 125,) will be required; and in such cases we have found advantage from the application of a blister, or stimulating embrocation; but the rules laid down in the section treating of these remedies, (p. 138,) must be strictly adhered to.

Severe purging is not an uncommon sequela of measles, and was treated with blood-letting by Sydenham, upon the theory that it arose "from vapors of inflamed blood rushing upon the guts." The theory is valuable, as being calculated to remind us of the existence of inflammatory diarrhœa, with tenderness of the abdomen, and fever; but we are not to suppose that bleeding is necessary or advisable in every case of purging after measles. Most commonly it will be removable by alterative aperients, (as No. 29, p. 162,) when the discharges are foul; or it may require astringents, if the stools be watery, and the abdomen drawn in and empty.

Varieties of Measles.—An eruption precisely similar in appearance to that of measles is occasionally seen, especially in young infants, and runs through a regular course, but without catarrhal symptoms. This has been denominated ***Rubeola sine Catarrho.*** It requires no particular treatment, being merely a local affection; but it is generally believed by authors that it does not, like true measles, confer an immunity from future attacks.* Many rashes of this kind, sometimes denominated *Roseola*, sometimes distinguished by the above-mentioned name, occur during infancy and childhood, dependent upon dentition or derangements of the digestive organs; but unless accompanied by the specific fever, and running the regular course, they are not to be looked upon as measles.

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* During an epidemic of measles which occurred in this city during the latter part of last year, (1839,) we observed the *Rubeola sine Catarrho* under peculiar circumstances, such as we do not recollect to have seen noticed by any author. In one family of four children all underwent an eruption accurately resembling measles, in its external character and period of duration; but without any fever or other constitutional derangement. All these individuals were attacked with genuine measles in the course of a week after the disappearance of the first eruption, and all passed through it favorably. We observed a similar occurrence in other isolated cases. [Note to Third Edition.]

Rubeola nigra is mentioned as another variety of measles, in which the rash assumes a peculiar dark hue. Sydenham attributes this appearance to the employment of stimulants and a hot regimen. He observes, that it only happens to grown people, and requires prompt measures of depletion. We have seen this character given by the conjunction of petechiæ with the eruption of measles, when a typhoid epidemic was prevalent—under which circumstances, a stimulant regimen and treatment will be demanded; in short, a management similar to that required in other low malignant fevers.

Inoculation of measles has been proposed by Dr. Home, of Edinburgh,* and was performed by him with blood drawn from a portion of skin affected with the rash. It has been performed by others in the same way, and also with lymph from one of the miliary vesicles which occasionally appear in the disease. In both ways, the affection appears to have been communicated, but not with much certainty, and the practice has not met with any general approval.

II.—SCARLET FEVER—(SCARLATINA.)

This name is applied to an eruptive fever, which about the second day results in the appearance of bright red patches upon the skin and mucous membrane of the mouth and throat, commonly declining about the fifth day. The symptoms vary so much with the type of the fever in different attacks and epidemics of this disease, that we must describe them under separate heads, as constituting distinct varieties of the affection.

a. Symptoms of Simple Scarlatina.—These are, at first, the ordinary symptoms of fever, viz.,—lassitude, shivering, succeeded by heat, thirst, quick pulse, and occasionally nausea, head-ache, or even delirium. These vary much in degree in different cases, from the slightest disturbance of the constitution to severe fever. About the second day, (according to Sauvages and Cullen, not until the fourth,) the eruption appears in the form of red spots—first upon the face and neck, and subsequently these coalesce and spread over the trunk and extremities. On the third day the eruption is at its height, and then appears in the form of a continuous bright redness upon the extremities, and of large irregular patches upon the trunk of the body. It has been likened by Huxham to the color produced by smearing over the skin with the *juice of raspberries.* The redness is paler in the morning, and assumes its greatest brightness towards evening. The skin subject to it is dry and very hot, but it gives to the touch no feeling of elevation, only a slight sense of roughness. It may, however, occasionally be intermingled with miliary vesicles, or papulæ, especially when the patient has been subjected to a stimulating treatment or regimen. The eruption may also be seen upon the inside of the mouth and throat, which assumes a bright scarlet color: the tongue, if clean, exhibits the same hue, or the papillæ appear through the coating of fur, and their redness, as well as that of the tip, affords a strong contrast to its white or yellowish color. Dependent upon the occurrence of the eruption in the fauces, there is always more or less sore throat. On the fifth day the eruption usually begins to decline, and in a day or two after altogether disappears—its departure being attended with a general desquamation of the cuticle from the whole surface of the body.

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* Medical Facts and Experiments, by Francis Home, M. D., London, 1759.

The foregoing is a description of the mildest form of scarlatina, which Sydenham terms but "the name of a disease." If, however, as that admirable physician states, it be treated "too learnedly," or if the invasion be in its own nature more severe, all the symptoms may be materially aggravated, and a dangerous disease presented to us. By some, such an aggravation of character has been considered to constitute a distinct variety, which they have described under the name of *Scarlatina Anginosa;* but the distinction is unnecessary, the difference being rather in degree than in kind, and the slighter character of the symptoms being convertible into a severer, merely by mismanagement; or peculiarity of constitution. The symptom of sore throat, to which the term *anginosa* refers, is common, in a greater or lesser degree, to all forms of scarlatina.

The *principles* of treatment, also, must be the same, whether the disease be mild or severe, provided only it be inflammatory, and there should be no difference, except in the degree to which we may find it necessary to work them out. We conceive, in short, that less confusion will be created, and a right understanding of the treatment facilitated, by considering as identical in nature, and only different in degree, all cases of the disease which possess inflammatory or sthenic characters, thereby including under one head the *Scarlatina, Simplex* and *Anginosa*, of most writers, and Dr. Armstrong's *Inflammatory Variety of the Scarlatina Maligna.*

All the symptoms, then, which we have described may exist in an aggravated degree; the fever may be more violent, with quicker pulse, greater head-ache, and more frequent delirium. The skin may be much hotter, amounting sometimes to 106°

or 108° F. There may be considerable derangement of the digestive functions, with oppression at the præcordia, vomiting, and dark stools. The soreness of throat, which in mild cases demands little attention, may be very severe and distressing, with pain and stiffness about the neck, painful deglutition, hoarseness, and a viscid secretion of mucus, causing much suffering by the efforts constantly excited for its expulsion. Upon looking into the throat, we may find considerable redness and swelling, and often, portions of lymph thrown out upon the tonsils and uvula, which may at first be mistaken for ulcers or sloughs of the mucous membrane, but are not so, as upon their removal by gargling, the latter will be perceived to be whole and unbroken. When the symptoms run to the height which we have just described, there is usually much nervous excitement, and the supervention of inflammation of the brain or other viscus is to be dreaded. Thus, after delirium and high cerebral excitement, the patient may suffer collapse, and ultimately sink into a state of coma, showing that congestion has taken place within the head. In other cases there may be diarrhœa and vomiting, with tenderness of the abdomen, indicating an inflammatory condition of the alimentary canal; or there may be fatal inflammation of the respiratory organs. Fatal gangrene of the throat may also supervene even upon the most inflammatory attacks of scarlatina; or acrid discharges may take place from the nostrils, causing sores about the lips and corners of the mouth. These latter circumstances may occur as a sort of secondary attack, upon the eighth or ninth day, after the patient has, apparently, got through the disease: thus, being somewhat analogous to the secondary fever of small pox. In severe attacks, there may be irregularities in the eruption: it may appear too soon; or it may be retarded; or, lastly, it may recede, or become faint too soon after its first appearance. When the fever has been violent, the desquamation is occasionally very remarkable, the whole cuticle peeling off the hand or foot in the form of a glove or sock.

As sequelæ of scarlatina, we frequently have dropsy, either in the cellular membrane, or in the cavities; also, abscesses in various situations; ophthalmia; suppuration from the ears; and various forms of scrofula. The dropsy most commonly affects the cellular membrane, especially of the hands, feet, and face; but it sometimes takes place in the cavities. A dropsical swelling of the hands and feet may follow very mild cases of the disease, setting in a week or ten days after the disappearance of the rash. It is attended by symptoms of an inflammatory kind, the pulse becoming quick, the stomach deranged, with costive or irritable bowels, nausea, and scanty, high-colored urine. When the face is affected, its pallor, and the swelling of the eyelids, give the patient a peculiarly bloated and unhealthy aspect. More rarely, effusion takes place into the head, chest, or abdomen; and it is then also of a more dangerous character — sometimes rapidly occasioning death. The urine in dropsy after scarlatina, is generally albuminous, and coagulates upon the application of heat.

b. Symptoms of Malignant Scarlatina.—Under this head, we shall consider the asthenic forms of scarlatina, or those in which the fever is of a low, typhoid type, whether that be occasioned by peculiarity in the prevailing epidemic, or bad state of constitution in the individual patient. Such forms of disease have been described by authors under different names, as *Angina* or *Cynanche Maligna, Angina Gangrenosa,* or *putrid ulcerous sore throat.* Malignant scarlatina is a most formidable disease, often sweeping away all the children of a family, in spite of the most judicious and zealous attentions of the physician.

In many cases the symptoms are, at first, similar to those already described; the patient being seized with severe headache, shivering, quick pulse, and other indications of fever, which, however, soon assumes a typhoid character: the pulse becomes very rapid and irregular, the heat of surface unequal; and a low muttering delirium, with great restlessness, sets in. In other instances, Huxham * describes the patient as "moving about for a day or two, neither sick nor well, as it were, but under uneasiness or anxiety, till they were obliged to lie for it." There is usually great dejection of spirits, sudden prostration of strength, and heaviness about the breast; the countenance is pale, sunk, and dirty; the eyes red and heavy; the tongue loaded with a brown fur, or unnaturally clean, and of a fiery red color. There is commonly nausea; often severe and protracted vomiting and purging; the discharges from the bowels, and the urine are much deranged—the former being, in children, usually loose, dark-colored, and fetid; the latter scanty, brown, and turbid. There is hoarseness, pain in swallowing, and painful swelling of the glands in the neck. The fauces appear somewhat swollen, and at the commencement, of a dark red hue; but whitish or ash-colored sloughs soon appear upon the tonsils and uvula, and the breath and odor of the body become very fetid. The rash in malignant scarlatina is irregular in its character and occurrence, being often faint or of a dark livid red color, or interspersed with petechiæ, but it may assume a bright scarlet hue. It also sometimes disappears soon after its first coming out, and it may return again in some hours or days.

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* Essay on Fevers, &c. London, 1757.

As the disease proceeds, all the symptoms are aggravated: there is extreme despondency and low delirium, or the patient sinks into a state of stupor. The sloughs in the throat spread, and become dark-colored and obviously gangrenous; the voice is hollow and hoarse, and the breathing accompanied by a peculiar rattling, as if from strangulation. The patient is constantly harassed with efforts to spit up the sloughs, mixed with viscid mucus, and often with blood. The disease extends to the nostrils; and an acrid, ichorous discharge is emitted, which excoriates the lips and cheeks of the child, and, according to Huxham, even the fingers and arms of the nurse. The swallowing of this matter, also, appears to cause irritation in the bowels, and a species of dysentery. Towards the end, the breathing becomes difficult, the tongue black and dry, and discharges of blood occasionally take place from the several passages, the patient sinking exhausted at different periods, varying (according to its original strength, or the violence of the malady) from the third or fourth day to the second or third week: total insensibility or convulsions may precede dissolution.

In some instances malignant scarlatina will prove fatal upon the second or third day, or even earlier, without the occurrence of death being explainable either by the progress of the gangrene of the throat, the amount of the typhoid symptoms, or the existence of any local congestion. Life in these cases, appears to be at once extinguished by an intense impression upon the nervous system in a manner analogous to, but equally unexplainable with, what occurs in cholera, and more rarely in the cold stage of intermittent fever; the vital principle being, as it were, suddenly discharged from the body. Dr. Armstrong* also relates cases in which "children, and even adults, some time after exposure, now and then die suddenly, from the operation of the contagion, without any appearance of efflorescence or of sore throat. They are attacked with convulsions, or with the symptoms of apoplexy, and frequently sink into insensibility and death in a few hours."

c. *Scarlatina of the Throat.*—Dr. Tweedie† has given a name *(Scarlatina Faucium)* to this variety of the disease, with which every practitioner must be familiar. It occurs chiefly among adults, and occasionally attacks those who have gone through the more regular form of scarlatina. It is, in fact, an appearance of the eruption in the mouth and throat, without any efflorescence upon the surface of the body. It is often attended with a good deal of fever, and may be followed by desquamation of the cuticle. It also appears to be capable of communicating an infection which will produce other forms of the disease.

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* Practical Illustrations of the Scarlet Fever. London, 1818.

† Cyc. Pract. Med. Art. Scarlatina.

Pathology.—Scarlatina is subject, although perhaps not so strictly, to the same general laws as regulate the other eruptive fevers. It occurs most frequently in the earlier periods of life; but as persons are not so certainly exposed to it during these periods as to measles, so the instances of its occurrence after puberty are more numerous than in the latter exanthem. In the circumstances of affording immunity against future attacks—of naturally running a definite course—of being, to a certain extent, spread by contagion, and of suspending the action of other exanthems, it is also generally acknowledged to obey the laws already enumerated. Attempts have been made to communicate it by inoculation, but these have not hitherto been successful.

We have stated, that scarlatina is, to a certain extent, spread by contagion; and it is well known to practitioners, that the different varieties which we have described may all owe their origin, and be distinctly traced, to the same source of infection. Like its kindred diseases, however, it is unquestionably of an epidemic nature, occurring usually about the end of summer and autumn, especially in wet and cold seasons, and prevailing until the commencement of spring. From the extraordinary difference in character between the mild and malignant varieties, these have been supposed by some to be distinct diseases; but this is disproved by the fact just stated, that the same source of infection may produce either form. The difference appears to lie partly in the habit of the patient, but chiefly in the *constitutio anni*, the epidemic taking a mild character when simple inflammatory diseases prevail, and running into an opposite form when the morbid tendency is low or typhoid. Looking upon the subject in this way, the simple scarlatina is to be considered as the true type of the disease, and the malignancy as something superinduced; just as the simplest wound may be attacked with erysipelas, when it happens to be rife in the locality, or when the subject is at the time in an unhealthy condition.

The post-mortem appearances in persons who die of scarlatina are various, according to the complications which may exist of inflammations or congestions in the several cavities. In the malignant form there is every evidence of a depraved and broken-down condition of the blood, putrefaction occurring rapidly, and livid spots and wheals existing even before death. Purulent matter is also occasionally found in the joints, without traces of inflammation, but as if deposited directly from the blood. We have stated that sudden death may occur at an early period; and then we may fail to discover any morbid changes apparently capable of causing dissolution. Dr. Currie[*] relates the case of his own daughter, in whom death was occasioned by ulceration of the glottis, symptoms resembling those of croup, attending.

Diagnosis.—The only affections with which scarlatina is likely to be confounded are measles and roseola. From the latter it may be distinguished by its regular, and longer duration, and by the presence of the sore throat, and efflorescence within the mouth; from the former by the period of appearance of the rash, by the characters of this, and by the sequelæ—all of which have been sufficiently dwelt upon.

Prognosis.—This depends both upon the nature of the particular epidemic, and the condition of the individual patient. The simple scarlatina, though it may be attended with severe symptoms, is not in itself a fatal disease; and when there is no complication of internal inflammation, and the rash is of a bright red color, comes out abundantly, and remains the usual time, we may hope for a favorable result: but still the sequelæ to which we have alluded are always to be dreaded, and often constitute far more formidable affections than the primary disease.—Among these, glandular swellings and other forms of scrofula, are most to be dreaded; dropsy, especially of the cavities, is also highly dangerous.

The malignant form is always attended with great hazard; the favorable signs are, a plentiful, bright eruption, (although even this may exist in very bad cases;) florid redness in the throat, and disposition of the sloughs to separate; general scaling off of the cuticle; and some degree of strength being kept up. Lividity or disappearance of the eruption, petechiæ, ulcerations about the lips, spreading of the disease in the throat, convulsions, stupor, and general prostration of strength, are among the most unfavorable signs. The mortality of different epidemics varies in a most remarkable manner; in some, scarcely a death occurring,—and in others, whole families being carried off. The danger appears to be greater to adults than to children, and to females than to males. Of 38 fatal cases, which occured in a total of 644 treated at the London Fever Hospital, 13 were males, and 25 females.[†]

Treatment, a.—In simple Scarlatina.—This must be regulated by the greater or lesser severity of the symptoms, the principle being to favor a development of the disease and prevent disturbance from accidental occurrences. In the mildest cases, the patient must be kept in bed, but not oppressed with an unusual quantity of clothes. The apartment should be cool and well ventilated, cooling drinks given freely, and abstinence from animal food and every thing heating strictly enjoined. A gentle emetic is almost always of service, by checking the fever and relaxing the skin, and also by clearing the throat of viscid mucus. Its action will be advantageously followed by a purgative; but we do not go the full length with Dr. Armstrong, in recommending the *continued* use of aperients; nor do we place as much reliance as he did, upon what he calls the *bold* administration of calomel. When the hepatic secretions are deranged, small doses of mercury* will, unquestionably, be useful; but we have long since ceased to think that calomel is a cure for febrile diseases. Currie strongly advocated the affusion with cold water, in inflammatory scarlatina; and when the patient is strong and plethoric, with a hot skin, the weather being also warm—when, in short, there is no likelihood of a want of re-action, this measure will be attended with the best results. We can commonly, however, substitute for it sponging with cold or tepid water and vinegar; and this is in every case safe, and generally highly useful, bringing down the heat, and affording much comfort. Tepid affusion, and the warm bath, have also been highly spoken of, in the treatment of scarlatina; but we have, ourselves, more experience of the benefits derivable from sponging.

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[*] Med. Reports. Liverpool, 1804.

[†] Cyclopædia of Practical Medicine, article Scarlatina.

Bleeding has been recommended by some, and in certain epidemics (as that described by Morton) has been found advantageous. The weight of authority is, however, against its general employment; and even by its patrons, it is recommended to be practised very cautiously. When visceral inflammation sets in during the course of scarlatina, and when we have the good fortune to discover it early, bleeding is certainly required, as it would be in ordinary fever under similar circumstances; but it is only as a matter of necessity that we must have recourse to it; for we believe that it is likely to prove injurious so far as the fever itself is concerned, delaying its regular course, and increasing the tendency to dangerous sequelæ. If we are obliged to take blood, in consequence of inflammation of any organ, the quantity must be left altogether to the judgment of the practitioner; enough should be taken to control the inflammatory tendency—but, if possible not one drop more.†

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* As in the pulv. rhei. comp. No. 29.

† For the sake of the *audi alteram partem*, we give the following quotation: "We gladly take this opportunity of asserting, from considerable *experience*, that copious blood-letting is the best remedy in severe cases of *scarl. anginosa;* and that the greater the tendency to malignancy is, the more boldly must it be employed. This change in the treatment of *scarl. maligna*, has naturally followed that of its congener *typhus*." *Edinb. Medical and Surgical Journal*, vol. xix. p. 448.

Nitre we have found to be of service in the early stages of scarlatina, as a cooling and useful febrifuge. It may be given in doses of from one to three grains, freshly dissolved in cold water or whey.

Gargles can seldom be used with children; and with them, as Dr. Armstrong justly remarks, mild emetics will be the best gargles, clearing the throat, and removing the viscid secretion, which often furnishes a serious obstacle to respiration. In infants, the latter circumstance requires that careful attention should be paid to the maintenance of a free passage for the air, as the obstruction produced by viscid phlegm has been known to prove fatal. When gargles can be employed, the best in ordinary cases is barley water and honey, acidulated with vinegar; or half a drachm of muriatic acid to an eight-ounce mixture. When the fauces are covered with masses of lymph, or small ash-colored sloughs, a more stimulating gargle will be useful, and an excellent one will be, a mixture of five ounces of infusion of roses, an ounce of honey, and a drachm of tincture of capsicum. The gargle recommended by Fothergill in mild cases was sage tea and vinegar. If we can get the patient to inhale the steam of hot water and vinegar, it will often afford much relief.

When the cuticle is desquamating, at the close of the disease, the tepid bath will be found useful, and very comfortable to the patient. At this period, exposure to cold must be carefully guarded against, and the child not let into the open air without additional clothing. These means, and keeping the bowels relaxed, and the kidnies in action, by small doses of the compound powder of jalap, we have found, in our own experience, the most efficient for preventing those dropsical effusions which form so disagreeable a sequela of scarlet fever.

There is often considerable debility at the close of the disease, and convalescence is not unfrequently tedious, obliging us to have recourse to tonic medicines, as mineral acids, or quinine; but mildly nutritious food will commonly be sufficient for the purpose; and any thing in the way of stimulants, as wine, &c., should be given with very great caution, as, in the weakened state of the system, they are extremely likely to excite dangerous local inflammations. Dr. Armstrong recommends mild fresh ale, in preference to wine; and, if any stimulant be required, it will usually answer well.

The hair very generally falls off, after scarlatina; and when we find any tendency to its doing so, it will be well to have the head shaved, and tepid shower baths used, as soon as the patient acquires strength enough to bear them.

Any special symptom, as diarrhœa, occurring during or after scarlatina, must be treated according to the particular indications belonging to it.

b. Treatment in Scarlatina Maligna.—When the disease exists under the form which we have described as the truly malignant, the acute stage is extremely short, and often scarcely appreciable,—typhoid symptoms manifesting themselves almost from the very onset. It is important to recollect this in the treatment, as it is only in the short stage of excitement that any measures of depletion are warrantable. Even Dr. Armstrong, who so strenuously advocated active means, admits that their use, except in the early stages, would be inevitably fatal. What are the measures of depletion proper even for this stage, comes next under consideration. Fothergill,* who was the first accurate describer of the disease in this country, utterly discountenanced bleeding, purging, and nitrous medicines; his plan consisting of gentle emetics in the first instance, and subsequently aromatic cordials, with anodynes when diarrhœa existed; and, as a local application, he recommended the mel Ægyptiacum. Huxham adopted somewhat of a similar plan, only, in addition to the emetic, using enemata to unload the bowels, and sometimes very mild laxatives, before employing aromatics or tonics. Mineral acids, also, appear to have been in estimation with him. Bleeding he was decidedly opposed to, in the truly malignant forms; although, carried to a small extent, he thought it might be useful when the disease had a more sthenic character. Currie styled bleeding and purging, fatal practice; and also condemned his own remedy, affusion with cold water, in malignant scarlatina. Dr. Armstrong advocated bleeding, upon the theory that, in the first stage, the apparent debility was produced by an oppression of the circulation, in consequence of a congestion of blood in the venous system; he also supposed that calomel had a special effect in equalizing the circulation, and accordingly he prescribed it in very large doses. These two measures, with active purging, and the saline warm bath, constituted his plan of treatment. Those, however, who read his Essay carefully, will easily perceive that he was not free from misgivings as to his practice; and it is equally obvious, that he considered the mere circumstance of the disease being severe and violent as a sufficient sanction for the use of severe and violent remedies. Such a notion, though popular and common, is altogether inconsistent with an enlarged view of disease, and justifies the apologue of D'Alembert,—the physician being then, truly, a blind man armed with a club, who, as chance directs the weight of his blow, will be certain of annihilating either nature or the disease. A fever being likely by its violence to produce speedy death, is no palliation of the guilt of a physician who administers a medicine in poisonous doses, even though he may be ingenious enough to construct a theory explaining, satisfactorily to himself, the *secundum artem* character of the murder he commits.*

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* Works, by Lettsom. London, 1784.

We are, on these accounts, as well as from the views our own experience has led us to adopt, obliged to differ considerably from many of Dr. Armstrong's positions, although fully impressed with the importance of some of them, and with the general ingenuity of his essay,—circumstances which, of course, only call for a more distinct warning against the dangers into which his theories might lead the inexperienced. Without going at any greater length into the opinions of others, we shall now state briefly our own ideas as to the proper treatment of the disease.

If any thing gives a chance of cutting short a typhoid fever, we believe it to be the sudden shock produced upon the nervous system by the operation of an emetic; and accordingly, our first step usually is, the administration of a medicine of this nature. When the patient is much excited, and no irritation of the bowels present, we prefer the tartarized antimony: when there is much feebleness, we usually employ ipecacuan; and this drug often operates advantageously upon children, by freeing their bowels, after its emetic action has been accomplished. With respect to actual aperients, we think they are often required and beneficial,—the discharges being depraved in character, and frequently destitute of bilious matter. They should, however, be of a mild kind, as the manna mixture, (No. 26, p. 157;) or, if we desire to give a mercurial, the compound rhubarb powder, (No. 29, p. 162.) If the affection of the throat be very distressing, occasioning much difficulty in respiration, before the appearance of sloughs, we may think it advisable to put leeches to the neck, or behind the ears; and if intense head-ache and stupor exist at the very commencement, the adoption of a similar measure may be justifiable, upon the grounds of local congestion being presumed to exist within the head. This is the utmost extent to which we can ourselves conscientiously go, in recommending depletory measures in *scarlatina maligna:* but it is right to state, that some experienced practitioners hope for benefit from a small blood-letting, if it can be performed at the very onset. When an epidemic invades a family of children, we may have an opportunity of trying this practice in cases arising during our attendance upon those earlier attacked; but it is, at best, an experiment, and must be tried with great caution. Our practice, in addition, during the stage of excitement, is to immerse the patient in a warm bath, strongly impregnated with salt, as Dr. Armstrong directs, and subsequently to rub the skin with warm dry flannel, especially when irregular distribution of heat exists; when, also, bottles of warm water, or heated bricks, should be applied to the cold extremities.

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* For such practitioners, we know no better advice than that of the judicious Huxham,—" at least to peruse the sixth commandment."

When the stage of excitement has passed, support will be required, and such nourishment as the patient can take, as broths, must be given; and if collapse approaches, wine and other direct stimulants will be demanded. By some, these latter have been much employed in the treatment of malignant scarlatina. Dr. Peart recommends carbonate of ammonia, in large doses, (five or six grains, every second or third hour,) as a sort of specific for the disease. We think, however, that stimulants should only be given when the patient is actually in a state of exhaustion,—as, in the weakened state of the circulatory system, they are very likely to occasion local determinations of blood, of a peculiarly dangerous character. We would, therefore, be desirous of using only such tonics as are unlikely to produce a heating or excitant effect, and, on this account, prefer the mineral acids, with small doses of sulphate of quinine.

Local treatment should attract our principal attention in bad cases of scarlatina, the local disease causing much distress, and probably sometimes perpetuating a destructive re-action in the system. When the case is met with early, the dusky red, erysipelatous inflammation existing in the fauces, without ulceration or sloughing, we would recommend the free application of a strong solution of nitrate of silver (ten grains to the ounce) to all the parts concerned. It can be best applied by means of a piece of lint sewed to the finger of a leather glove, which latter is to be placed upon the forefinger of the operator. When sloughing or ulceration has set in, we have found the best applications to be the mel Ægyptiacum; or a linctus made of five grains of sulphate of copper, and half an ounce of honey. If gargles can be used, the capsicum gargle already mentioned may be prescribed. Dr. A. T. Thompson recommends one composed of 12 drachms of the chloro-sodaic solution, of Labarraque, to five and a half ounces of water and half an ounce of honey. Fumigations of chlorine and other gases have been recommended, but are not much employed in practice. The application of blisters in this disease, at least to children, is, we conceive, contra-indicated by the tendency to gangrene which exists, and which is likely to be communicated to the blistered surface. There is one measure, in the treatment of malignant scarlatina, of which we have not yet spoken, although it is probably the most important and efficient of all. We allude to the free admission of fresh air. In children living in crowded apartments, we have witnessed the most marked change in the condition of the throat to be immediately produced by free exposure to air; and in every possible case, we would recommend the practice to be adopted.

If a patient be fortunate enough to become convalescent from scarlatina maligna, the greatest delicacy of management is required, in order to prevent local congestions, or other dangerous sequelæ, from occurring. While sufficient mild nourishment is given, a careful antiphlogistic regimen must be observed, every thing stimulant or heating being avoided, and gentle laxatives administered, so as to prevent any accumulations in the bowels. By such a plan, we shall also best prevent the dropsical effusion which is likely to follow the sthenic form of the disease. When this latter sequela has once set in, it requires purgatives, and sometimes blood-letting, being usually of an inflammatory character, as is evinced by the state of the pulse, skin, and secretions. Convalescence from any form of scarlatina is often tedious; and the patient should never be pronounced out of danger, until a state of perfect health be regained.

Prophylaxis.—Dr. Hahnemann, of Leipzig, the originator of the homœopathic doctrine, has put forward the opinion that belladonna possesses the power of preventing the reception of the infection of scarlatina. His plan is to dissolve three grains of the extract of belladonna in an ounce of distilled water, and give two or three drops twice a day to a child under a year old, and one drop more for every year additional, during the time of exposure to infection. His views have been corroborated by several German physicians; but we cannot speak of the plan from any experience of our own.

III.—SMALL POX, (VARIOLA.)

This eruptive fever, though once the destroyer of entire nations, has now, thanks to the genius of Jenner! almost ceased to engage the attention of physicians. Its continued existence, however, should not be forgotten, nor any neglect of the proper precautions against its ravages be induced by security, even though that has been now enjoyed for nearly fifty years. We shall consider the disease as it occurs in the mild or distinct; the severe or confluent; and the modified forms.

a. Symptoms of Distinct Small Pox.—Natural small pox runs through a regular course of three distinct stages, viz.—

1. Of incubation; 2. Of maturation; and, 3. Of decline. The space of time between the reception of the infection and the first invasion of the febrile symptoms, although probably a definite one, has not been absolutely agreed upon by writers; the average period, however, appears to be about fourteen days. The commencement of the fever is commonly well marked, being for the most part a sudden and severe rigor, followed by excessive heat, pain in the head and back, nausea, pain at the pit of the stomach, weakness and giddiness, with disposition to heavy sleep. In children, we have observed the first appreciable symptom to be a convulsive fit; and this was considered by Sydenham to be a favorable sign. The symptoms just enumerated are those belonging to other eruptive or ordinary fevers, and can only be inferred to belong to small pox by a knowledge of exposure to contagion.

On the fourth day,* inclusive, from the commencement of fever, the second stage begins. An eruption of small, red, elevated pimples shows itself, first upon the face, and neck, and subsequently upon the rest of the body, being completely out in a period varying from twenty-four hours to two or three days. The eruption is not confined to the skin, being often extended to the mucous membrane of the mouth and throat, and sometimes to the tunica conjunctiva of the eye. Its appearance is usually accompanied by a considerable abatement of the febrile symptoms, and sometimes by profuse sweating. The pimples quickly grow larger and higher, their increase in size being attended with pains in the jaws, and general redness of the skin. In two or three days from their first appearance, they become vesicular, the vesicle being formed of distinct cells, containing a straw-colored fluid, and *depressed in the centre:* their seat is in the true skin.

From day to day, the redness and swelling of the skin increases, and is accompanied with pain; the face becomes swollen, so that the eyelids are usually closed; the hands and fingers also swell. The distinct cells in the vesicles gradually run together, and, losing the central depression, they *acuminate* and form pustules, filled with a thick, opake yellowish matter. This process, called *maturation*, is completed about the eighth day from the commencement of the fever; and the pustules are then about the size of a pea; yellow, and in some places rough, and the intervening skin of a florid red color, resembling the hue of a damask rose. On the eleventh day, the swelling and inflammation of the skin on the body and face decline, and the pustules upon these parts dry up, and form scabs, which fall off about the fourteenth or fifteenth day, leaving behind, in some cases, the peculiar marks of the disease—in others, merely discolored spots, which soon disappear. The pustules on the hands remain a day or two after the others, and often break, and leave troublesome sores.

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* This is Sydenham's account. Dr. Gregory, in the article "Small Pox," Cyc. Pract. Med. states the duration of the fever to be forty-eight hours.

b. Symptoms of Confluent Small Pox.—These are, in the first stage, similar to those of the distinct form, but more severe and violent, the fever running higher, and being accompanied by considerable nervous excitement, often amounting to delirium. The eruption appears, generally, upon the third day, coming out earlier than in the milder form; but Sydenham observes, that when the fever is of extraordinary violence, there may be no eruption until the fourth or fifth day. The febrile symptoms do not so markedly abate upon the commencement of the second stage, as they do in the distinct variety, but continue with greater or lesser severity. At first, the eruption has nothing peculiar in itself; but, in a day or two, it will be perceived that the pustules are not rising so high, or filling so much as usual; and by degrees those upon the face run into one another, and form one continuous bag, containing a thin sanious fluid, instead of pus. The face becomes considerably swollen; and as the confluence takes place, it loses its red color, and becomes pallid and doughy. About the eighth day, the covering of the pustules changes to a dusky color, or it bursts, and dark brownish fetid scabs are formed. In either case, the surface becomes rough; and at length, towards the twentieth day, large scales fall off, disclosing ulcerations of the true skin, which ultimately leave permanent pits and seams. It is principally upon the face that the confluence of the pustules takes place; and the danger of a particular case is chiefly to be inferred from the condition of the face, both as to the number of pustules upon it, and their more or less unhealthy appearance. During the course of confluent small pox, children are commonly affected with diarrhœa, which appears to be analogous to the salivation to which adults are subject during the stage of eruption.

In the distinct form, we have stated that the fever abates considerably upon the coming out of the eruption, and does not, under ordinary circumstances, return again during the course of the disease. This, however, is not usually the case in the form we are now considering—as about the tenth or eleventh day from the commencement, when the scabs are forming, an attack of *secondary fever* often sets in. This is attended with a variety of distressing symptoms: the skin becomes dry and hot, with quickened pulse, white tongue, and thirst; the head is often affected at this time, violent delirium or coma being present, or that peculiar affection of the nervous system, resembling *delirium tremens*, which is occasionally observed to attend upon severe accidents, as burns or scalds, &c. The chest is also liable to be affected, especially the pleura, which is not uncommonly the seat of sudden and fatal inflammation. The abdomen, it is said, is not so commonly the seat of disease in small pox as either of the other cavities. Boils and abscesses may, also, form in various parts of the body, and may be accompanied with glandular swellings and petechiæ, or hæmorrhages from some of the passages. Gangrene of the genitals is not an unfrequent occurrence, and usually proves fatal. A destructive ophthalmia invading all the textures of the eye, and often causing sloughing of the cornea, is also a common complication.

c. Symptoms of Modified Small Pox.—Variola has occasionally occurred epidemically, in a peculiarly mild form, and has been, under such circumstances, described by the older authors as "stone pox," "horn pox," or "siliquose pox." The disease, also, although usually obedient to the general law of the exanthemata, of occurring but once in the same individual, does sometimes recur; and in about the same ratio of frequency, it visits those who have been protected by vaccination. When it recurs under these circumstances, it assumes the modified characters, which we shall now describe.

The first stage of modified small pox differs little from that of the natural form, the fever being often very severe, and presenting no peculiar characters. There is, however, considerable difference in the eruption, which is seldom very copious, and usually begins to decline about the fifth day. The fever mostly abates upon the appearance of the eruption, and the pocks do not advance to maturity, but dry up and become hard and horny, by the fifth day. When they fall off, a mottled red condition of the skin remains, and sometimes a slight pitting continues visible for a considerable period, or even may be permanent. Although the pustules may sometimes be numerous, and even run together, becoming partially confluent, still the fever is seldom high after the first stage, and there are rarely any dangerous complications. That the disease is actually small pox is, however, proved by its being the result of exposure to contagion, and also by its being capable of communicating a severe form of the disease by inoculation.

Pathology.—Small pox obeys the general laws of exanthematous diseases. It is, however, less a disease of childhood than any of the others, probably because it is more usually propagated by contagion, and possesses rather less of an epidemic nature. The contagious character is very well marked; but appears to be most strong during the stages of maturation and decline. The type of an individual case does not always appear to influence the disease produced by infection from it, in another patient, as the mildest cases may communicate the most severe form, and *vicè versâ.* With respect to the type of the disease, much variation is produced by the peculiar constitution of the patient, and also by the epidemic constitution of the year or season. Certain persons, but those very few in number, appear to be altogether insusceptible of variolous infection.

The morbid appearances observable in those who die of small pox are, for the most part, those proper to complications which arise during the progress of the case—being inflammatory conditions of the brain, or respiratory organs: ulceration of the bowels is sometimes met with; but the abdomen is comparatively seldom the seat of lesion. When the disease has been peculiarly malignant, and the fever typhoid, marks of putrescency will be observable in the rapid approach of putrefaction, and the existence of livid wheals and petechiæ upon the surface of the body. The larynx and trachea sometimes present peculiar appearances—being covered with a quantity of dark-colored, viscid secretion, and the mucous membrane being thickened and pulpy, or even in a sloughy and disorganized condition. We have already particularized, at p. 306, an instance of fatal ulceration of the rima glottidis supervening upon small pox.

Diagnosis.—The characters of the fever and eruption sufficiently distinguish small pox. It can only be confounded with varicella, or chicken pox, which is to be known by its shorter and milder course. The modified small pox can, however, scarcely be distinguished from varicella, and is by some considered to be identical with it.

Prognosis.—This must be entirely regulated by the form of the disease, and by the absence or presence, and character of complications. Confluence of the pustules is always a sign of danger; as is also a large number of pustules upon the face, and their remaining flat and pale, instead of filling well, and being surrounded with a bright red areola. Hoarseness, or croupy cough, is unfavorable, as indicating an affection of the larynx. The state of the system must be taken into account, and also the age. Healthy persons, neither very plethoric nor delicate, will escape best; while infants and very young children are more liable to suffer complications than those of a more advanced age. Any evidences of a debilitated system, as petechiæ, hæmorrhage, gangrene, &c., are very unfavorable signs. Certain periods of the disease appear to be particularly critical: these are stated by Sydenham to be, in the distinct form, the eighth, and in the confluent the eleventh days, from the commencement of the fever. In making a prognosis, even in mild cases of small pox, we must recollect the liability to dangerous sequelæ which always exists; various forms of scrofula, and severe ophthalmia, for example, being likely to follow attacks apparently very favorable in their primary states. The average mortality of small pox may be stated at about one-fourth of those who are attacked; and when we reflect upon the small probability of any individual escaping from the frequent epidemics which raged before the happy discovery of Jenner, we must be led to form a frightful estimate of the destroying power of this formidable disease.

Treatment.—The principle upon which the treatment of every form of small pox should be conducted is, in a word, the prevention of any circumstance which may be likely to disturb or interrupt its natural course. Any steps, on the one hand, which may heighten the fever, as a hot regimen and apartment; or which, on the other, may diminish the strength to the degree of causing debility, as inordinate evacuations,—will produce such disturbing effect, and should be carefully avoided. The happy medium desirable to be attained is the restraining of the fever, so as to prevent the occurrence of local congestions or inflammations, and at the same time to leave a sufficient degree of strength to enable the patient to pass through what may be a tedious and debilitating disease.

To furnish rules for the attainment of these objects, we cannot do better than give the substance of Sydenham's plan of treatment, which has never been improved upon, and which, if we consider the state of opinion existing at the time of its promulgation, may be safely recommended to the student as a model of the observation, reasoning, and practice of a true physician.

"As soon," says Sydenham, "as the signs of this disease show themselves, I keep the sick from the open air, and forbid them the use of wine and flesh, and allow them small-beer gently warmed, with a toast, for their ordinary drink, and now and then I permit them to drink as much of it as they will. I order them, for their victuals, oatmeal and barley broth, and roasted apples, and other things which are neither too hot nor too cold, nor of too hard a digestion. I forthwith prohibit a hotter regimen, and the use of all manner of cordial medicines, * * * for I have more than once observed, in young people of a sanguine complexion, that a hot regimen and cordials given on purpose to force out the small pox before the due time, have so little promoted their coming out, that, on the contrary, they have given a check to it * * * till at length, by allowing small-beer, and taking off part of the load of clothes wherewith he was roasted, I have made a convenient way for the pustules to go out; and so I have put the patient out of danger, by God's assistance." He also discountenanced confinement of the patient to bed in mild cases before the fourth day: "for bloody urine, purple spots, and other mortal symptoms, come upon people merely because they are too soon confined to their beds." After the fourth day, he recommended opiates at bed-time, for the purpose of allaying irritation; and their employment is sanctioned by our knowledge of the benefit often derived from them in the treatment of that low form of delirium attendant upon burns and scalds,—a state, similar to which, so frequently accompanies small pox. In addition to this treatment, should there be no diarrhœa present, it will be advisable to free the bowels gently by injections or mild aperients, as the manna mixture, (No. 25, p. 157,) or the powder of rhubarb and magnesia, (No. 27, p. 161.) Sydenham was not solicitous about restraining the diarrhœa which sometimes attends, considering it to be critical.

When the fever ran high in plethoric persons, Sydenham recommended blood-letting: with children this measure is not so frequently called for; but if we meet with very high febrile symptoms, and especially if any tendency be evinced to local inflammation in the head or chest, we must draw sufficient blood, either from the arm or by leeches, to moderate those symptoms. Our dread of subsequent debility must always be moderated by the recollection that over-action, which is particularly liable to occur in this disease, frequently produces prostration of strength, and that the reduction of such over-action in time, may be the most efficient means of husbanding the patient's powers. It is, however, not to be forgotten that the extensive suppuration, which ought to take place in the maturation of the pustules, requires that the strength should not be wantonly taxed.

In the distinct form, after the coming out of the pustules Sydenham continued the same antiphlogistic regimen, but allowed the patient to rise from bed for a few hours every day, unless the weather was cold, or there was a large eruption, when he kept the patient continually in bed, but with no more clothes upon him than when he was in health, so as to avoid, if possible, the production of perspiration.

When the disease is going off, mildly nutritious food may be given; and if there be restlessness, an occasional anodyne; but stimulants are not often required, and must always be resorted to with extreme caution. The state of the bowels should be watched throughout this stage, and mild laxatives administered, when necessary.

When the disease is confluent, greater care is required in the commencement, to prevent the fever from attaining a dangerous height; but the principles of treatment are identical with those which we have just laid down. When the secondary fever has set in, it must be met by diluent drinks, occasional aperients, and, if there be irritation and restlessness, opiates;—bleeding is seldom safe at this late period. Among children, Sydenham justly remarks, opiates are not so often advisable, as they would tend to stop the diarrhœa, which is not to be unnecessarily interfered with, being, in fact, a sort of critical evacuation. In bad cases, the access of secondary fever is sometimes quickly followed by extreme debility, coldness of the extremities, petechiæ, and, in short, the whole train of typhoid symptoms. A similar state is sometimes produced by the drain of matter from the pustules, when these are very numerous; and sloughing sores upon parts of the body exposed to pressure, may also attend. Under these circumstances, wine, tonics, and stimulants are called for, and furnish the only means of supporting the patient's strength. The pustules do not require any particular local treatment; they should be left to themselves, except so far as anointing them with a little cold cream, or oil of almonds, when they become hard—or dusting over the surface with starch, or other dry powder, when they are discharging thin, sanious matter. The hands of children should be muffled, to prevent them from breaking the pustules upon their faces, which the extreme itching would otherwise lead them to do. The hair of the head, also, should be clipped, as otherwise it is apt to become matted with the discharge, and then to occasion great irritation and pain.

The different complications and sequelæ must be treated upon ordinary principles; but it is particularly necessary to guard against the effects of ophthalmia. When this inflammation occurs it must be promptly checked by the application of leeches, or such other remedies as may be required, otherwise there will be considerable risk of destruction of sight. There is nothing particular to be said upon the treatment of modified small pox: the principles of its management are similar to those already laid down.

Inoculation for Small Pox.—It would be exceeding our limits to go at any length into a consideration of this subject, as it is now happily superseded by vaccination. The practice was first introduced into Great Britain from Turkey by Lady Mary Wortley Montague, and was found materially to diminish the perils of small pox. It has since been discountenanced by judicial decisions,* in consequence of the equal security afforded by vaccine inoculation, and the additional advantage possessed by the latter measure in not constituting artificial fomites of variolous infection.

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* The King v. Burnet, and the King v. Vantandillo. 4 Maule and Selwyn, pp. 271-73.

More recently the propagation of small pox, by inoculation or wilful exposure to infection, has been made punishable with one month's imprisonment, by the 3rd and 4th Vic. c. 29, s. 8. [Note to 4th Edition.]

The mode of inoculating, is similar to that of vaccinating, which shall be treated of at length. The manner in which the disease runs its course, when introduced in this way into the system, is as follows:

On the third day after inoculation, the wounds show some slight marks of irritation, and a minute pimple is perceptible. On the fourth day, this is converted into a vesicle with a depressed centre, and the patient begins to feel an itching and slight uneasiness in the part, which upon the sixth day is increased to pain and stiffness, extending towards the nearest lymphatic glands. About the seventh or eighth day, rigors and other febrile symptoms, as nausea, head-ache, pain in the back, occur, and in the course of forty-eight hours afterwards, the eruption appears. The number of pustules is generally very limited, and they usually run their course precisely in the same manner as the natural, distinct pox. In some cases, however, the result is not so favorable, death occasionally occurring;—shortly after the introduction of inoculation into Great Britain, and its adoption with two of the Princesses of the blood, the practice did actually receive a check in consequence of its producing fatal results in three remarkable instances.

We have introduced a notice of the subject here, on account of its weight as a pathological phenomenon; but as matters stand at present, it is the unquestionable duty of every practitioner to discourage the practice of variolous inoculation, both as being opposed to the spirit of the law, and as being a measure hazardous to the community, by keeping alive the infection of a most baleful disease. For a full consideration, however, of all the bearings of the question, we must refer to our chapter on Vaccination.

IV.—CHICKEN OR SWINE POX (VARICELLA.)

This mild exanthem may be said to be peculiar to the period of childhood, as it very rarely affects adults. It has been divided by authors into four varieties—viz. V. Lentiformis vel Lymphatica, V. Coniformis, V. Globularis, V. Corymbosa: the division is based upon the varying characters of the eruption, but is of no practical importance.

Symptoms.—We have always observed the eruption of chicken pox to be preceded by more or less fever; the patient usually undergoing a rigor, succeeded by the ordinary febrile symptoms, for a day or two before the appearance of the rash.

Such is also the opinion of Dr. Willan[*] and of Dr. Copland,[†] although it is asserted by some writers that febrile symptoms are unusual.

The eruption first appears upon the back, neck, and breast, the face being comparatively free. It very early (indeed, usually from the very commencement) assumes a vesicular character, coming out suddenly in the form of little blisters, about the size of split peas, and filled with a transparent, straw-colored, or yellow lymph. These vesicles may be lenticular, conoidal, or globular, or may run together in clusters, thus constituting the four varieties. If they happen to be punctured, or are broken, the fluid is discharged, and the cuticle falls evenly on the cutis, there being no elevation or hardness in the latter tissue. Successive crops of vesicles come out, which is characteristic of the disease, not occurring in any of the other eruptive fevers. There is usually a slight degree of redness of the skin around the vesicles; and they are commonly accompanied with itching, which mostly causes them to be broken early. About the fourth or fifth day, they begin to dry up, being converted into brown, gummy scabs. These crumble off in the course of a week or ten days, sometimes leaving slight pits, but more generally, mere discolorations of the skin.

Pathology.—Chicken pox obeys the general laws of the exanthemata: its contagious nature, however, is not so clearly made out as that of the others, as it has not been satisfactorily proved that it can be communicated by inoculation. It has been supposed by some to be merely a mild variety of small pox; and this question, which is a curious and interesting one, shall be discussed in the chapter on Vaccination.

Diagnosis.—Chicken pox is to be distinguished from small pox (supposing it not to be a modified form of that disease) by its mildness; by the rash early assuming a vesicular character, the vesicles not being depressed in the centre, and coming out in successive crops. It must be confessed, however, that it is not easy to discriminate it from some forms of modified small pox.

Prognosis.—This is always favorable,—no danger existing except from accidental complications.

Treatment.—Very little is required, it being merely necessary to keep the child in bed for two or three days, and to prohibit animal food or heating drinks. Towards the close, a mild laxative may be given, and the return to ordinary food and habits gradually effected.

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[*] On Vaccine Inoculation.

[†] Dictionary of Practical Medicine.

CHAPTER XIII.

VACCINATION.*

Edward Jenner, of Berkeley, to whom mankind is indebted for a knowledge of the great blessing of vaccination, became acquainted, (in consequence of his residence among the dairies of Gloucestershire,) at a very early period of his life, with traditionary accounts of the security afforded against small pox, by the casual introduction into the sytem, of a disease occasionally prevalent among the cows in that county. The description of the original disease will probably be best given in his own words.

"It has obtained," he says, "the name of cow pox. It appears on the nipples of the cows, in the form of irregular pustules. At their first appearance they are commonly of a palish blue, or rather of a color somewhat approaching to livid, and are surrounded by an inflammation. These pustules, unless a timely remedy be applied, frequently degenerate into phagedenic ulcers, which prove extremely troublesome. The animals become indisposed, and the secretion of milk is much lessened."† From these pustules, infection is soon communicated to the hands of the milker. Inflamed spots appear about the joints and extremities of the fingers; these assume the form of circular vesicles, with elevated edges and depressed centres, and of a "color distantly approaching to blue." From the irritation and friction to which the vesicles are usually exposed, they most commonly ulcerate, and often pass into phagedenic sores. When this is the case and the points of infection are numerous, considerable fever and disturbance are excited in the constitution. The axillary glands become inflamed, and there is head-ache, quick pulse, rigors, &c. Reasoning from a great number of individual instances which fell under his notice, and from the general opinion of the country, Dr. Jenner came to the conclusion that persons affected in the manner described, became insusceptible of the infection of small pox. In a happy hour the idea struck him that it might be possible to extend the protection, by the artificial communication of the disease from one individual to another; and accordingly, on the 14th of May, 1796, he made the first vaccine inoculation. The subject was a boy named

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* The matter of this chapter is now republished from a paper by Dr. Maunsell, in the 4th volume of the Dublin Medical Journal.

† Inquiry, &c., 3d. Ed. p. 4.

James Phipps; and the matter was procured from a sore on the hand of Sarah Nelmes, a dairy-maid, who had been infected casually in the course of her occupation. On the 1st of July following, the experiment was tested by inoculating the boy with variolous matter, taken directly from the pustule. This was again repeated, after some months, "but no sensible effect produced on the constitution." Similar experiments were tried upon others; and in June, 1798, Jenner published his first work upon the subject. His hypothesis at this period was, that cow pox and small pox were modifications of the same disease, and that the origin of both was to be found in the cutaneous inflammation to which horses are subject, and which, when it affects their heels, is termed *grease.* He conceived, however, that although a disease resembling cow pox might be communicated to a human subject directly from the horse, still it failed to afford protection unless it had intermediately passed through the system of the cow. In every instance he thought the disease in the cow could be traced to infection, either from another animal of the same species, or from the matter of *grease*, communicated by the hands of the milker. By after observations it has been ascertained that the *grease*, at its commencement, and before its characteristics have been destroyed by friction, is a vesicular eruption, very similar in appearance to that which occurs upon the nipples of the cow. It is also stated that Mr. Gardner succeeded in producing the vaccine disease in the cow by a direct inoculation from the eruption in question; and that Dr. Loy, and Dr. Sacco of Milan, were able to produce it, from the same source, directly in the human subject.* In Jenner's "Inquiry," and indeed generally in the early stages of the investigation of cow pox, we find the term pustule applied to characterize its form. The disease, however, is strictly vesicular,† but the mistake was owing to the peculiar circumstances under which it was usually observed in the cow; its situation, upon the nipple, never allowing it to run its course uninterruptedly, and the natural inflammation being usually much increased by friction. When the infection was communicated casually to the human subject, a similar interference with its progress almost invariably occurred, and in the first cases of inoculation was not sufficiently guarded against. On this account a very considerable febrile disturbance was frequently excited in the system; not by "the first action of the virus," but by the subsequent existence of corroding ulcers, and this indisposition was erroneously considered necessary to the success of the inoculation. Another error consequent on the supposition of the pustular origin of the eruption, was the employment of purulent matter or ichor from an ulcer, for the propagation of the disease. The sagacity of Jenner, at a later period, discovered both these mistakes: he continued, however, to the last, to apply the term pustule, and has not in any part of his works given a very satisfactory account of the appearances and progress of the complaint, so that it was some time after the discovery before its exact characters were ascertained and recorded. In describing these, we shall avail ourselves freely of the descriptions given in the papers of the National Vaccine Board, and of those contained in Dr. Labatt's excellent Address to the Medical Practitioners of Ireland.

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* Life of Jenner, by Dr. Baron.

† It may be well to keep in our minds the strict definitions of these two forms of cutaneous eruption:—"Vesicle; a small orbicular elevation of the cuticle, containing lymph, which is sometimes clear and colorless, but often opake and whitish, or pearl-colored. Pustule: an elevation of the cuticle, with an inflamed base, containing pus."—*Willan.*

About the third or fourth day after vaccination, a small red pimple is formed on the site of the operation. This is hard to the touch, and slightly elevated: if it be examined through a magnifier, a slight efflorescence will be seen to surround it, and sometimes a minute vesicle will be discovered on its apex. The tumor gradually enlarges, and about the fifth or sixth day the vesicle becomes apparent to the eye. It is circular in its form, elevated at the edges, but with a depressed centre; and when at its greatest size, is sometimes indented by one or two concentric furrows, resembling, to use the simile of Mr. Bryce, a worm coiled under the skin. It goes on increasing in size until the tenth or eleventh day, when it is usually about four lines in diameter. The size, however, varies according to the mode of inoculation; if it has been performed by puncture, it is generally small; whereas, when several scratches have been made, two or three vesicles frequently form, and subsequently run together. The color of the vesicle is at first a light pink; sometimes with a blueish shade, which gradually changes to a pearl color. The centre is darker than the margin, which is firm, turgid, and shining. Internally, the vesicle consists of numerous little cells, filled with clear transparent lymph, and, according to Dr. Willan, communicating with each other. We should think, however, from the difficulty experienced in evacuating the lymph, that the communication is at all events not very free. The quantity of virus varies considerably in different vesicles, and will usually be found to possess activity in an inverse proportion with its quantity. Dr. Joseph Clarke suggested to Dr. Labatt, that this might probably be accounted for by supposing the increased quantity of fluid to depend, not upon an increase of the specific virus, but upon a discharge of serum excited by the mechanical irritation of the part. On the eighth or ninth day there is formed round the base of the vesicle an inflamed ring, which spreads rapidly, and about the tenth day forms an areola of an inch and a half or two inches in diameter. This areola is intensely red, and is accompanied by some degree of tumefaction and hardness. The redness continues for a day or two, and then begins to fade, generally from the centre to the circumference, sometimes forming two or three concentric rings. After the tenth day, the vesicle begins to decline; the centre first turns brown, and the whole gradually changes into a hard, smooth crust, of a dark mahogany color, having, like the vesicle, a concave surface. About the twentieth day, the crust falls off, leaving a permanent circular cicatrix, a little depressed, and marked with small pits, probably equal in number with the cells of which the vesicle had been composed.

The vesicle in very young children sometimes appears a little earlier than has been described; more frequently, however, the deviation is to a later period. In some instances we have known it to remain dormant for ten or twelve days; in others, Dr. Labatt has observed it bearing the characters of an ordinary phlegmon until the eighth, tenth, or twelfth day, when it assumed the regular vesicular appearance. In all these cases, if the subsequent stages be regular, slight deviations as to time are of no moment.

The progress of cow pox is sometimes suspended by the intervention of other diseases, and after their removal, proceeds regularly with its usual marks. Dr. Jenner relates two cases in which the vesicles advanced to maturity, during the existence, in one instance, of scarlatina, and in the other of measles: the areola, however, did not appear until these diseases had subsided. When the vesicle has advanced through all its stages, to the formation of the hard crust, local irritation will sometimes occasion the formation of pus; this, however, is by no means to be regarded as a regular part of the process, and may usually be prevented by preserving the part from injury. During the early period of the history of vaccination, considerable stress was (as has been already observed) laid upon the constitutional affection. Since, however, the nature of the disease has been more perfectly ascertained, and more attention paid to the preservation of the vesicle from injury, it has been found that the general symptoms are usually very slight, often scarcely perceptible. They commonly occur from the seventh to the eleventh day, and consist in restlessness, slight shiverings, followed by heat, with thirst and head-ache. In infants there is, occasionally, sickness and vomiting, and the child is peevish, or drowsy and oppressed. Eruptions are not usual concomitants of vaccination; but frequently, in children, a slight form of strophulus will be observed. As the sympathies of the skin are so active in these subjects, it is of course not easy to determine whether the rash be a consequence of the infection, or an accidental occurrence.

One of Dr. Jenner's main positions was, that a constitutional as well as a local affection should follow the inoculation of cow pox, in order to insure to the patient the full amount of protection. From the extreme slightness of the febrile symptoms, it is often impossible to declare, upon their evidence, that any constitutional disease has been felt, and it therefore becomes a desideratum to have some sure test of the general affection of the system. According to the instructions of the Vaccine Board, we may be satisfied that this has taken place, "when the progress of the vaccine vesicles has been regular and complete;" and this is, no doubt, *prima facie* evidence to that effect. In the following case, however, which occurred under our own eyes, the local disease was so regular, although not absolutely complete, in its progress, as to appear to us to furnish grounds for doubting the *invariable* correctness of this conclusion. A child, four months old, was vaccinated, and had two well-formed and perfectly regular vesicles; from one of which, on the eighth day, six other children were infected. On the ninth day the child was very feverish, and on the tenth, small pox pustules appeared. These ran their regular course, maturating about the ninth or tenth day from their appearance, and having the characteristic depression of centre. The six children inoculated from the vaccine vesicle, had the vaccine disease perfectly and favorably. In this case, as the small pox was not modified, we should be disposed to infer, that the constitution was not affected by the vaccination, although the vesicles were sufficiently mature to afford virus capable of exciting a perfect disease in six other individuals. An analogous case is related by Mr. Dawson, in the Transactions of the College of Physicians, London, vol. iii. p. 385, in which, small pox pustules upon two children furnished matter for the successful inoculation of nineteen persons, although the children themselves suffered no fever, nor general eruption of pustules, and in a few days afterwards, upon a second inoculation, took the disease regularly. Instances of local small pox pustules without fever, occurring in persons much exposed to infection, but who have had variola before, may be found in the works of Huxham and many others, and these have been sometimes found to be capable of communicating the disease by inoculation. Notwithstanding, however, "these loops to hang a doubt upon" in individual instances, we are strongly inclined to think, that there is a fair presumption of the constitution having been properly affected, whenever the local disease has gone through the regular course exactly as it has been described above, with perfect areola, cicatrix, &c.

At the commencement of the vaccine inquiry, small pox inoculation was employed as the criterion of a constitutional infection of cow pox; at present it is fortunately difficult to procure variolous matter for the trial, and even were it always at hand, the risk of disseminating contagion would render its use unjustifiable. When any shadow of doubt exists as to the efficacy of a vaccination, we should, of course, always repeat the operation; but it is not to be expected that in every successful case, the constitution will be insusceptible of a re-vaccination. Very frequently, the secondary insertion of virus will be followed either by an erysipelatous inflammation of the arm, or by an irregular vesicle, quickly running to a termination, and generally without an areola or permanent cicatrix. Jenner, however, has observed and recorded cases, in which both casual and inoculated cow pox occurred twice and even thrice in the same individual:* it was also his opinion, that vaccination occasionally took effect perfectly, after small pox. From these facts it is plain, that re-vaccination cannot completely satisfy us as to the success or failure of the first operation, the local disease may appear a second or third time, or perhaps much oftener, with its characters so well marked, as to furnish, at each repetition, only an additional source of doubt.

Owing, however, to the ingenuity of Mr. Bryce, we have a test of the constitutional affection, the validity of which, when it is properly executed, has not, we think, yet been successfully impeached. Reasoning analogically from some experiments upon the inoculation of small pox, Mr. Bryce was induced to make similar trials with vaccine matter, and found "that if, during the regular progress of cow pox, a second inoculation be performed, about the end of the fifth, or beginning of the sixth day after the first, (i. e. between thirty-six and forty-eight hours before the areola of the first begins to appear,) the affection produced by this second inoculation, will be accelerated in its progress, so as to arrive at maturity, and again fade at nearly the same time as the affection arising from the first inoculation; and that this will take place, although the constitutional affection be so slight as otherwise to pass unnoticed." If we take matter, for example, on the fifth day after a successful vaccination, and insert it into the opposite arm, this second operation will be followed by a minute vesicle on the third or fourth day, being the eighth or ninth from the date of the first, and will be immediately afterwards surrounded with an areola, becoming, on the fifth day of its own existence, an exact miniature of the first upon its tenth day: both will have finished their course at the same period, that being usually the thirteenth day from the first inoculation, and eighth from the second. The rationale of the acceleration which thus takes place in the progress of the second vesicle, may be explained in a few words: the phenomena of the ordinary cow pox before the eighth day, or in other words until the appearance of the areola, are strictly local; when this appears, we may look upon it as a visible sign of the specific fever (or perhaps we should rather say action) being in operation in the system, and as a consequence of this general action, we find that a specific areola appears around any local vesicle of the same disease that may at the time actually exist upon the surface of the body, although that disease may not be in existence sufficiently long, according to the known laws of the disease, to be itself the cause of this phenomenon. The proper time for putting this test in practice, has been mentioned to be from thirty-six to forty-eight hours before the appearance of the first areola;* this is the latest period at which we can expect it to succeed, "as it is necessary that the secondary affection may have proceeded some length, and that a small vesicle containing virus may have been formed by it, before the constitutional action from the first inoculation begins, otherwise no areola, but merely a slight degree of hardness will take place from the second puncture."† We defer it to the latest period, in order to afford the strongest possible contrast between the progress of the two inoculations. In estimating the value of this test, it is to be recollected, that from unskilfulness in the performance of the operation, or from some other accidental cause, the second vaccination may not take effect at all; with common care, however, this is unlikely to happen, as, by taking the virus from the first vesicle, we are sure of its being in the very best state for communicating the disease. Upon the whole, we think it is a plan which should, if possible, always be adopted, at least in private practice; for we are aware, that in this country it would be very difficult to procure in public institutions a sufficient number of attendances on the part of each patient, to enable us to carry it properly into effect.

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* We had an opportunity lately, through the kindness of Dr. S. Cusack, of seeing a family of four children, who had been vaccinated at the Cow pox Institution of this city, and subsequently re-vaccinated by Dr. C. In one of them the operation entirely failed; in two, one of whom was a girl of fifteen, irregular vesicles were excited; and in the fourth, a child three years old, a perfect disease with an areola followed. In all the children the cicatrices were perfect.

Having considered the disease as it exists, in its most perfect state, it will now be well, before entering upon the much disputed question of its value, to attend to the modes adopted for its artificial propagation, and the circumstances requiring attention during the process. First, then, as to the age and condition of the person to be vaccinated; it is agreed by all writers that the most favorable time for communicating the disease to an infant is between the ages of six weeks and two months, which, as Mr. Marshall* observes, "is prior to the irritation of teething," and is also subsequent to the extreme irritability of first infancy. Should circumstances require it, however, there is little risk in vaccinating a child immediately after its birth, as has been repeatedly done with safety and advantage when small pox was near, and sometimes even when the mother was suffering under that disease.

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* This, in ordinary cases, will be on the sixth day, but where the first vesicle has been slow, we must, of course, defer the second operation.

† Bryce, 2d ed. p. 189.

It is very desirable that no fever, specific or otherwise, should exist in the system at the time of vaccinating, and also that the surface of the body should be free from eruptions, as in either case the local disease will probably be imperfect, and the constitutional affection be very likely to be suspended, or perhaps altogether prevented. It has been observed, however, both by Jenner and Bryce, that chronic eruptions are sometimes benefitted by the introduction of the vaccine disease; and their existence is not sufficient to prevent us from vaccinating, although it would certainly be calculated to make us more suspicious of the case, and ought to induce us to repeat the operation upon a future occasion.

The probability of exposure to small pox contagion would of course make us more anxious to anticipate it, if possible, by a milder disease; and indeed we are not aware of any other conditions than those alluded to, either of the body or season, that could make us hesitate about submitting an individual to vaccination.

A most important point in the conduct of vaccine inoculation is the employment of active virus, which we can of course only procure from perfect specimens of the local disease. In the early periods of the practice, much confusion and disappointment arose from an imperfect understanding of the stages of the affection; and some mischief was done before Jenner discovered the necessity of always employing matter in a limpid state. Later observers all pretty well agree in recommending the virus to be taken, not merely when in a limpid state, but before the areola has begun to form; and accordingly, the vesicles are now almost universally opened for infection on the eighth day. If the progress of a vesicle be slow, but at the same time regular in other respects, we may safely employ matter taken a day or two later, provided the areola has not appeared.

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* Popular Summary of Vaccination.

Having selected a vesicle at the proper period, we make, with the point of a lancet, three or four slight punctures in its elevated margin, from which minute drops of transparent lymph will soon be observed to exude. This may be either taken upon the lancet, and at once inserted into the skin of another individual, or may be collected and preserved for future use.* In the preservation considerable attention is required, in order to prevent a destruction of the specific properties of the virus, either by decomposition, or by exposure to the action of the atmosphere. To effect these purposes, various contrivances have been devised; one of the best is, to receive the lymph upon a small square of glass, allow it to dry, and then, covering it with a similar piece of glass, fold both up in a portion of moistened bladder or gold-beaters' skin. For more immediate use, it may be taken upon thin pointed blades of quill or ivory: these should be charged with lymph two or three times, being allowed to dry between each charging, and then enclosed into a packet, with gold-beaters' skin. When it has been desired to keep the virus for a considerable length of time, it has been allowed to ascend from the punctured vesicle into glass capillary tubes, or into glass tubes with bulbs, the air having been rarified in the latter by the application of a lighted taper: in either case, the tubes are to be hermetically sealed immediately on their being charged with matter. Mr. Bryce ascertained, that although the fluid found in the vesicle after the formation of the areola seldom produced a perfect disease, still the dry crust of a mature cow-pock always succeeded. He explained this apparent anomaly by inferring that the crust is actually the limpid virus in a concentrated state; and that the fluid occasionally found in the vesicle, after the crust has begun to form, is merely the product of irritation, and not specific. At all events, a solution of the crust is found to produce a true cow-pock; and by keeping it dry in a well-stopped phial, its activity can be preserved to a very extended period.

We may now consider the manner of communicating the infection, which, in every possible instance, should be done with liquid virus taken directly from a vesicle. The best site for the operation is over the insertion of the deltoid muscle, as being the part of the arm least likely to be disturbed by muscular action. It may be performed either by scratch or puncture; in the latter case by stretching the skin, and introducing the point of the charged lancet obliquely between the cuticle and cutis, keeping it in the wound for a few seconds, and then wiping it repeatedly over the puncture. In the insertion by scratch, which we think much preferable to the other, and which, when well done with fresh lymph, scarcely ever fails, a very blunt, but clean lancet answers best: this should be charged with virus in the manner already described, and its edge then drawn repeatedly, but very lightly, over the cuticle, so as to make five or six scratches, each about the eighth of an inch in length. Upon these the lancet should be rubbed until the lymph has been completely wiped from its point. When done properly, no blood should flow from these scratches; they should merely become red, like those accidentally made with the point of a pin. They require no dressing; and by exposure for a few minutes to the air, the small quantity of serum which exudes from them becomes hardened into a thin scab. At least two points of insertion should always be made, and by some it is recommended to make two in each arm. This, however, is unnecessary, unless we require a large stock of infection; and the chances of the vesicles being preserved entire, will be much diminished by the attention of the nurse being divided between both arms. At all events, one vesicle should always be allowed to run its course entire; and when only one point of inoculation has succeeded, that should not be punctured for the supply of virus. According to the hypothesis already stated, of the disease being strictly local at its commencement, we may conceive it possible to prevent the constitutional affection by removing the lymph, on the absorption of which its excitement is altogether dependent.

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* If it be not convenient to employ the virus immediately, we may keep it on the lancet, but only for a few hours, as the latter very soon rusts.

When, instead of the recent infection, we have to employ that which has been preserved dry upon glass, we must take upon the point of a lancet the smallest possible portion of *cold* water, (a very low degree of heat with moisture is sufficient to decompose the virus,) and rub it on the lymph until the latter is completely dissolved. The solution is then to be collected on the lancet, and used precisely as the recent matter.

When employing points of ivory, or other material, we must first make a slight oblique puncture with a lancet, and into it insert the point, which is to be allowed to remain for a minute or two, and then to be wiped frequently over the puncture.

When capillary or other tubes are used, the matter must be expelled from the broken tube with a blow-pipe, and then inserted in the same manner as if it were recent. Crusts, as recommended by Mr. Bryce, are prepared for use by solution in a drop or two of cold water. Lancets employed in the operation, it is scarcely necessary to say, should be kept perfectly clean and free from rust, as they might otherwise produce sores which would materially interfere with the disease we wish to establish. In performing the operation, the great cause of failure appears to us to be the occasioning of a flow of blood;

there should be merely sufficient to color the wounds—more than this would, in all probability, wash away the minute portion of fluid virus usually employed.

Medical treatment is seldom required during the progress of cow pox; nothing, in fact, is necessary in ordinary cases, except a little attention towards the preserving of the part from friction: when, unfortunately, this cannot be accomplished, inflammation is sometimes excited, which must be treated according to the ordinary rules of surgery. Dr. Jenner's practice in these cases consisted in the application of a drop of Goulard's extract to the broken vesicle, or occasionally a plaster of strong mercurial ointment. With a little care all injury may be avoided, and we have seldom seen the employment of any surgical means, more active than a poultice, required. As for internal treatment, we have never known any thing necessary, excepting, now and then, the exhibition of a mild aperient.

In concluding this portion of the subject, we must not let it escape our recollection, that there are idiosyncracies of constitution which resist our best directed efforts for the communication of cow pox, and that a similar circumstance has been observed with respect to small pox. When we meet with such a case, we must, of course, after a fair number of trials with fresh and active virus, leave the patient to chance; and after some lapse of time make another attempt, upon the probability of a change having taken place in the system.

The term *imperfect* or *spurious vaccination* is frequently to be met with in books, and has been the cause of no small degree of confusion in practice, although, at the same time, it has frequently afforded the practitioner an excellent asylum against the storms now and then arising out of failures in the protective powers of the vaccine disease. This portion of the subject has received much attention from Dr. Willan, by whom the different appearances consequent upon imperfect vaccination have been divided into three varieties—pustules, ulcerations, and irregular vesicles. Their causes have also been referred, by the same author, to three classes—impurity of the virus, occasioned either by heat, or being taken at a late period, or by exposure to air, moisture, rust, &c.; secondly, the sytem of the person inoculated being under the influence of any fever; and thirdly, his being affected with some chronic cutaneous disorder.

With respect to the two first *varieties* we may as well cut the knot, and save much minute and tedious description, by at once referring to the characters of a cow-pock, as already laid down, and which there can be no difficulty in distinguishing from a pustule or an ulceration. Should either of these, then, follow vaccination, it must be considered not as a variety of vaccine disease, but as much an accidental occurrence as if the slight wound were attended by phlegmon or erysipelas.* With the irregular vesicles, however, the case is different, as they, in many instances, closely resemble the true disease, and in some have even furnished virus capable of exciting it perfectly in other individuals: three sorts have been observed by the distinguished physician already mentioned, which we shall describe pretty nearly in his own words.† The first is a pearl colored vesicle, set on a hard, dark red base, slightly elevated. It is globate, and less in size than the genuine vesicle, its top is flattened, or sometimes a little depressed, but the margin is not rounded or prominent. The second appears to be cellular like the genuine vesicle, but is somewhat smaller, and more sessile, and has a sharp angulated edge. The areola in both of these is usually more diffuse than in the regular disease; in the second it is sometimes of a dilute scarlet color, and radiated. The areola appears round these vesicles, on the seventh or eighth day after inoculation, (sometimes earlier,) and continues more or less vivid for three days, during which time the scab is completely formed. The scab is smaller and lighter colored than in the regular disease, and falls off sooner, leaving a smaller and less permanent cicatrix. The third irregular appearance is a vesicle without an areola, which usually takes place if the person has previously had small pox, or is at the same time laboring under some fever. The two first forms of irregular vesicles will, no doubt, appear to the student to have no very marked characters by which an inexperienced observer could distinguish them from those of a more genuine nature; and the confusion, we apprehend, will not be diminished, when we find Dr. Willan admitting that they will in some cases afford full security against small pox, although in others, that disease will take place after them, at different intervals, and under a particular form.

The true state of the case we believe to be, that the cow pox is, like other diseases, liable to some slight variations, in its symptoms, and that, in many instances the too enthusiastic partisans of vaccination made use of these to help them out of the dilemma in which the occasional failure of the practice involved them. Whenever small pox occurred to a person who had been vaccinated, a ready answer to all their doubts was furnished by the supposition of his having been the subject of irregular vesicles. In other instances, as, for example, when the areola is deficient, we must adopt Mr. Bryce's notion, and suppose the disease to be merely local, and not to have affected the constitution. An excellent rule, however, is, in all cases in which a shadow of doubt remains upon our minds as to the efficacy of the inoculation, always to repeat the process, and avail ourselves of the valuable and ingenious test of Mr. Bryce.

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* We are aware that Dr. Willan supposed there was a real *vaccine pustule*, capable, in "a few instances," of communicating by inoculation the genuine vesicle. We have ventured above to state our own opinion, conceiving that the adoption of it will afford a simpler rule of practice, and remove some difficulty from the subject.

† Willan on Vaccine Inoculation.

In approaching the consideration of the vaccine controversy, we are fully aware of the extraordinary difficulties common to it, and every other subject involving, in any degree, the inscrutable principles of contagion. As we have now, however, an experience of the effects of vaccination in various parts of the world, during a period of thirty-five years, we should hope that without bewildering ourselves in abstruse reasoning, it will be possible to find, among medical records, numerical evidence sufficient to warrant us in placing our conclusions high upon the scale of medical probabilities: a rank that, it is never to be forgotten, is the very highest that can be obtained for any portion of a science whose data are influenced by the varying and unascertained laws of vitality. Of the importance of any measure that would diminish the ravages of small pox it is not now necessary to speak, as it has been long since practically acknowledged by the adoption of variolous inoculation. Of the advantages of vaccination over this latter, supposing it to be equally preventive of small pox, it is scarcely more necessary to adduce proof. We may mention, however, that cow pox is only propagated by actual inoculation, while every case of inoculated small pox becomes a new fomes for the dissemination of infectious miasmata; that cow pox never terminates fatally, nor ever excites scrofula or other chronic constitutional diseases, but, on the contrary, has been observed occasionally to be beneficial in some cases of cutaneous eruptions; while inoculated small pox not only frequently produces blindness and other deformities, and developes scrofula in the constitution, but has been estimated by Dr. Willan to be fatal in the proportion of 1 to 250 cases, and by Dr. Jurin, in the large ratio of 1 to 50. So little too was the general advantage promoted by this practice, however beneficial it might be to individuals, that it has been ascertained by the calculations of Dr. Heberden, that, from the increased exposure to infection, the general mortality of small pox rose, after the introduction of inoculation from 70 to 95 in 1000.* So much for the personal merits (if we may so speak) of the two diseases. We shall now inquire, first, whether vaccination affords any protection, and if so, to what extent? Secondly, has the present vaccine disease lost any of its properties by having passed through a number of human constitutions? And, thirdly, has the general employment of vaccination been found to increase the mortality of other diseases of infancy?

With respect to the first part of the first query, we can have no more conclusive reply than is furnished by the cases recorded in Dr. Jenner's work, and which were made by him the ground-work of his reasonings upon the subject. One of the shortest of these may be quoted in the author's words, and will serve as a specimen of the rest:—"John Philips, a tradesman of Berkeley, had the cow pox at nine years of age. At the age of sixty-two I inoculated him, and was careful in selecting matter in its most active state. It was taken from the arm of a boy just before the commencement of the eruptive fever, and instantly inserted. It very speedily produced a sting-like feel in the part. An efflorescence appeared, which on the fourth day was rather extensive, and some degree of pain and stiffness was felt about the shoulder; but on the fifth day these symptoms began to disappear, and in a day or two after went entirely off, without producing any effect on the system." A vast number of cases presenting the general features of the foregoing were observed by Dr. Jenner and his friends, and form a body of evidence that could not be resisted, at a period when every mind was prejudiced against the new doctrine, and that would now only be weakened by an impertinent attempt at corroboration. With respect to the objections to those cases urged by Mr. Brown, of Musselburgh, (the chief opponent of vaccination in the present day,) viz. that the individuals were either insusceptible, or that the protective impression was kept up by continual exposure to infection from the cow, it will be necessary merely to remark, that, as in the instance quoted, many of the persons mentioned by Jenner were for years removed from the influence of cow pox infection, and that if we suppose them to be accidentally insusceptible, the exceptions will be so numerous, as to become of necessity converted into a rule. An account has already been given of the circumstances under which Jenner put his theory to the test of experiment, the whole, we think, proving as demonstratively as the subject will admit, that the general tenor of the vaccine disease is to destroy the constitutional susceptibility to small pox contagion. We shall now, merely to show that we are not dependent for proofs upon the observations of others, cite one of those striking examples of protection, many of which must fall under the observation of every person in the constant habit of vaccinating. About four years since we vaccinated with the same virus three children of the same family, and who were in the habit of occupying one bed. Small pox was prevalent in the neighborhood, and two of our patients were seized with rigors a few hours subsequent to their vaccination; each had a very severe attack of small pox; the third, who at night constantly slept between these two, had a perfect vaccine vesicle, and completely escaped the other disease.

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* We quote these numbers from the Edin. Rev. vol. ix., not being able, just now, to lay our hands on Dr. Heberden's paper.

In attempting to reply to the second part of our first query, a number of the most disputed parts of the subject will naturally come under our consideration. We shall first examine a few of the most prominent and authentic statements as to the numerical effects of vaccination upon mortality, and in doing so, cannot avoid expressing our regret at the total neglect in which the important subject of medical statistics is suffered to lie by the government of these countries. In every other civilized state of Europe, medical or political inquirers can obtain from the highest sources authentic records of facts, without which, their doctrines, that so especially involve the happiness of the human race, are but vain speculations. In England, on the contrary, the only fountain of knowledge is the London bills of mortality, and in this division of the empire we are without even the scanty stream of information which they supply. All that could have been derived from the bills of mortality on the subject of small pox and vaccination, has, however, been given to the public by Dr. Jurin and Sir Gilbert Blane, and incomplete as it is, it affords highly gratifying conclusions, which we shall endeavor to weave in with some of the more accurate records of other states. From an examination of the bills during a period of forty-two years, Dr. Jurin* found that one in fourteen of all who were born died of small pox; by Frank, Süssmilch,† and Black, the general mortality of the human race from this disease was estimated at about eight or nine per cent. Duvillard states that of 100 born, only four reached the age of thirty without undergoing the small pox, and that the mortality among adults affected was one in seven or eight, but among infants so much as one in three. For the purpose of comparing the effects of small pox inoculation and of vaccination, with the unchecked effects of natural small pox, Sir G. Blane‡ has constructed, from the bills of mortality, four tables of periods of fifteen years each, showing the ratio borne by the mortality of small pox, to the total mortality. These are as follows:—in the first period, which was that immediately preceding the introduction of inoculation:

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* Account of Success of Inoculating the Small Pox, &c., 1723–6.

† Göttliche Ordnung, &c. Berlin, 1742.

‡ Med. Chir. Trans. vol. x.

From 1706 to 1720 the proportion was one in 12.7 or 78 in 1,000.

In the second and third periods, when inoculation had made considerable progress, the proportions were,

From 1745 to 1759, 1 in 11.2 or 89 in 1,000.
From 1784 to 1798, 1 in 11 or 90 in 1,000.

In the fourth period, when vaccination had been some years in use, viz.:

From 1804 to 1818, only 1 in 18.9 or 53 in 1,000.

By calculations founded upon these tables, Sir G. Blane has estimated the saving of lives during the latter fifteen years, in London alone, at 23,134, a result very gratifying, but still alloyed by the reflection, that it is but a fragment of the good that might have been done, were it not for our own, almost national, caprice, and childish refusal of the slight restraint upon personal liberty that would accrue from the legal enforcement of vaccination. From Sweden, for example, where the authority of government is interposed in favor of the measure, we are furnished with the following interesting document:

In the year	1779	small pox destroyed	15,000 persons.[*]
	1784	- -	12,000
	1800	- -	12,800
	1801	- -	6,000
	1822	- -	11
	1823	- -	37

In Prussia, also, (according to Dr. Casper,[†]) the most marked advantages have followed the introduction of vaccination. In the years 1820 and 1821 the deaths from small pox were 3,137, in a population of twenty-three millions, making one in 7,204 inhabitants. In Berlin alone, the average annual number of deaths from small pox, during the twenty years preceding 1802, was 472; during twenty years succeeding 1802, it was 175, since 1812 it amounted only to 50; since 1817 to 12; and in 1821 and 1822, there was only one death from this cause in each year. During the ten years preceding 1823, the deaths from small pox, compared to every 1,000 births, were as nine; before the introduction of cow pox, they were as eighty-three: whence it would appear that seventy-four lives in 1,000 were preserved by the practice of vaccination. But it would be superfluous to multiply these statements; the foregoing have been taken almost at random from the chaos of records upon the subject, existing in every journal, in almost every language; and surely, to use the enthusiastic words of Blane, these are "benefits which could never have been dreamt of by the most sanguine philanthropist," and which must overwhelm us "with a sense of unrequitable obligation to the individual who first disclosed and promulgated the secret."

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[*] B. Hawkins on Med. Statistics, p. 143.

[†] Review of J. L. Casper on Med. Statistics, in Edinburgh Medical and Surgical Journal, xxvi. 171.

Such have been the gross numerical results of vaccination, which would appear of themselves sufficient to obtain universal support for the practice. The arguments, however, of the anti-vaccinists, have never been drawn from the only source of any value in an uncertain science—a general average of facts; but have invariably been built upon isolated occurrences which we shall probably find to be fully entitled to the character of exceptions. At the commencement of vaccination, the new disease was confidently put forward, as a complete and perfect preventive of small pox, and was implicitly received as such by its partisans. The notion was so far fortunate as favoring the rapid and extensive adoption of the practice, and as such was wisely countenanced by its discoverer. From the cautious style, however, of many passages of his work, it is not difficult to perceive that Jenner, though a parent fond of his offspring, had sufficient of that foresight of difficulties, so peculiarly characteristic of genius, to enable him to perceive, that like every human thing, his discovery was not altogether infallible. Signs of this spirit may be observed in the anxiety which he exhibits to prove, that the occurrence of small pox, whether casual or inoculated, does not perfectly extinguish in the constitution, the susceptibility to that disease.* It appears to us obvious, that without wishing, at the time, to moot the question, he perceived that if the possibility of small pox occurring twice, was once established, its occasional appearance after vaccination, would excite neither surprise nor alarm. In the writings of the anti-vaccinists, this view of the subject was altogether overlooked, and all their conclusions made to depend upon the assumption, that small pox inoculation furnished a perfect and complete protection against the future occurrence of the disease. That it did not do so, will be proved to the satisfaction of the most skeptical, by an examination of the cases detailed in Jenner's own work; and those alluded to in Moore's History of Small Pox, and in the 9th vol. of the Edinburgh Review, p. 62, not to speak of the numerous cases scattered through all the periodicals, and those with which the memory of most practitioners will furnish them, either of the actual re-occurrence of small pox itself, or of those other diseases, as scarlatina, measles, &c., which may be supposed to furnish reasonable analogies.

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* Inquiry, &c. p. 116

To exhibit the ratio in which small pox has occurred secondary to itself or to vaccination, and also its mortality under such circumstances, it will be useful to examine some numerical records. In the year 1825,* 419 persons were admitted into the London Small Pox Hospital; 263 had no protection, and of these 107 died; two had been inoculated with small pox, of whom one died; and 147 had been vaccinated; among the latter the mortality was twelve.† During the year 1818, small pox was epidemic in Edinburgh, and 556 cases were seen by Dr. Thomson ‡ of that city. Of these, 205 had no protection, and 50 died, or 1 in 4; 41 had previously had small pox, several being deeply marked; 30 other cases of secondary small pox were reported to Dr. T., and of the whole 71, 3 died, or 1 in 23; 310 of Dr. T.'s patients had been vaccinated, and in only *one* did the small pox prove fatal. In Norwich,§ during the year 1819, 3,000 individuals caught small pox, of whom 530 died; it was estimated that there were in that city 10,000 persons who had been vaccinated, and that of these 2 in 100 caught small pox; only six of them however had it in a perfect form, of whom two died. The disease also proved fatal to one individual who had previously undergone variolous inoculation. These numbers speak for themselves, and when contrasted with the natural small pox mortality, of 1 in 5 or 6, loudly and unanswerably proclaim the great advantages of vaccination. It appears, however, that although the mortality of small pox in those who had undergone cow pox was very trifling, still a considerable number of the vaccinated actually underwent the disease, but only when variola prevailed as an epidemic, as inoculation alone has not been found sufficient to overcome the preventive influence of vaccination.

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* Dr. George Gregory, in Med. and Phys. Journal, vol. lv.

† The announcement of this mortality excited, at the time, considerable alarm, which was, however, quieted by a Report of the Vaccine Board, and a letter from Sir H. Halford to Mr. Hobhouse, (vide Medical and Physical Journal, *ut supra,*) showing, from Dr. Gregory's own admissions, that in not more than one of the twelve cases was there evidence of perfect vaccination. There is also a difference between the tot and the separate numbers, the tot being 419, while 263+2+147, make only 412. We have, however, inserted the report, as although it may be considered one of the most unfavorable that has been ever made upon the subject, the mortality it shows from small pox after vaccination is only eight per cent., while that from secondary small pox is fifty, and that from the uninfluenced disease upwards of forty per cent.

‡ On Varioloid Diseases.

§ Cross on Varioloid Epidemic, Lond. 1820.

The reader will naturally be led to inquire, why, in the same epidemic, the disease is found to be so mild in the vaccinated, and so severe and fatal in the unprotected. The reason is obscured by the same veil that envelopes the cause of the usually singular occurrence of some diseases, and which, in all probability, will never be penetrated by human eye. The fact, however, is, that small pox secondary to itself, or to vaccination, becomes very different in many of its symptoms from the uninfluenced disease; and it is upon this power of modifying, when it cannot altogether prevent, that the claims of cow pox as a protective agent must now be rested.

The observations and experiments of Dr. Willan,* enabled him to form some conclusions upon this modifying power, the substance of which it may be useful to state: 1st, inoculations with vaccine and variolous matter, performed upon the same person at the same period, or with an interval of not more than a week, were both found to prove effective to a certain extent, so far as to produce a vaccine vesicle, and variolous pustules, each respectively capable of communicating their peculiar infection to other individuals; 2nd, that when variolous matter was inserted on the ninth day after vaccination, its action seemed to be wholly precluded; and 3rd, that when the two diseases took effect as mentioned above, they always modified and restrained each other, an irregular vaccine vesicle being produced; and a variolous eruption of "hard, distinct, shining pustules, which have but little inflammation round them, and which seldom maturate," resembling strongly those varieties of variola, called by the older writers "stone pox," "horn pox," "siliquose pox," † &c. &c.

It is this modified disease, then, which occurs in almost every instance in which small pox attacks a person who has previously been the subject of cow pox inoculation. That a similarly mild form of small pox sometimes occurs naturally, and in an epidemic form, may be inferred from the descriptions in old works of those eruptions named above. Jenner also mentions an epidemic of a peculiarly mild nature, which spread through several towns of Gloucestershire, and was witnessed by himself. A similar variety was described under the name of pearl pox, by Dr. Adams,‡ who hoped to substitute it for the ordinary sort, by successive inoculations from the mildest cases. The mildness, however, appears to depend upon the constitution of the individual epidemic; as it was found by Willan and others, that inoculation from pustules, modified by vaccination, produced occasionally the worst forms of the disease. This *modifying* influence appears to be possessed by small pox itself, and to affect its secondary attacks; it is supposed, however, by Thomson and Bryce,[*] to be less efficient in this respect than cow pox; and the same opinion appears to be entertained by Dr. Möhl of Copenhagen,[†] as he records 31 fatal cases out of 153 of secondary small pox.

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* On Vaccine Inoculation, 1806.

† For an accurate and interesting description, see Thomson on Varioloid Diseases.

‡ Popular View, &c. London, 1807.

Before leaving this part of our subject, we must (though with extreme reluctance) notice the remarks of Dr. Gregory, in the 12th volume of the Med. Chir. Transactions. We confess, in our anxiety to avoid controversy, we should have evaded doing so altogether, were it not that Dr. G. has subsequently informed us,[‡] that his paper has excited the favorable attention of the profession; and that the paper itself, from its dubious style rather than its sound arguments, is well calculated to produce an injurious effect upon the minds of casual readers. In the first place, then, with respect to the increasing number of cases of small pox after vaccination—when it is considered that the number of the vaccinated *to take* small pox is every year increasing, the surprise, probably, will be lessened; and perhaps altogether removed, when we find that Dr. G.'s cases were "after *presumed* as well as real vaccination." Again, as to the *manner* in which variola is modified by vaccination, Dr. G. alleges that neither the eruptive fever, nor quantity of the eruption is usually lessened, nor the effect of the poison upon the brain and nervous system rendered less fatal. As to the first assertion, it will be best met by the Doctor's own account of fifty-four out of fifty-seven cases being "discharged in perfect health *within* fourteen days from the period of their admission." [§] In proof of his second position, respecting the fatal effect of the modified disease upon the brain, he has adduced two cases. One of them, however, is that of a drunken "laborer in lead works," and the other of death from erysipelas following venesection for ophthalmia in a woman who had gone through small pox, but in whom (according to himself) "vaccination was not trustworthy." In three other cases out of the five fatal he admits that one had no cicatrix, and that the other two had cicatrices large and irregular. Amidst the dark hints of Dr. Gregory, the partizans of vaccination will generally find some gleams of encouragement. He tells us, for example, that George Ferriman, who had been inoculated for small pox, was admitted into the hospital with "*pretty severe*" modified variola, and that with him were admitted his two children, who had been vaccinated, both laboring under a "very slight" form of the same disease; and again, that the large majority of his patients had been vaccinated in the country, and had *large*, *irregular*, and therefore *imperfect* cicatrices."

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[*] Thomson, Op. Cit pp. 60 and 202.

[†] De Variolidibus et Varicellis. Copenhagen, 1827.

[‡] Medical and Physical Journal, vol. lv.

[§] By the way, if Dr. G. discharged fifty-four cured out of fifty-seven, it is not easy to understand by what process of arithmetic he had a remainder of *five fatal cases*. Vide Trans. p. 334.

Another observation was contained in the paper now alluded to, and was more developed in subsequent papers,* which, we fear, has been the occasion of much disturbance in the public mind. It was, "that the majority of cases of small pox, after vaccination, which have occurred at the small pox hospital, have been persons between the ages of 15 and 21." Upon this was afterwards built a revival of Mr. Brown's opinion, "that the influence of cow-pox on the system wears out in the progress of life, and requires periodical renewals."† Mr. B. thought that the influence wore out in six years, Dr. Gregory extended the period to ten. A brief allusion to Mr. Brown's conception of and practice in the vaccine disease will enable us very shortly to dispose of his share in the argument. He contends that if you only have a vesicle with an areola, you may depend upon the production of whatever effect cow pox is capable of: again, in his practice he surrounded the punctures with a stripe of flannel, used gentle violence, made the child lie on the inoculated arm, and took no virus until the areola was formed.‡ Dr. Gregory asserts that he has not been able to re-vaccinate children under ten years, and that the same age is the earliest at which he has seen small pox among the vaccinated. He admits, however, that he has met resistance after twenty-five years; and as to the table in his first paper, like many an edged tool, it cuts both ways, having a descending scale from the age of twenty, as well as an ascending one to it. Dr. Möhl of Copenhagen, in some degree advocates the same opinion, at least he thinks that the modifying influence is somewhat weakened by time, but his scale is liable to the same objection as Dr. Gregory's; he found,

Under 3 years	0 Cases,
" 5	14
Between 5 and 10	102
" 10 and 15	173
" 15 and 20	187
" 20 and 25	156
Above 25	21
	653

Dr. Thomson found the modified disease to occur, on the other hand, at every period after vaccination; and Jenner, with his usual foresight, "selected in his first work, cases in which the disease (cow pox) had appeared at a very distant period, previous to the experiments made with variolous matter, to show that the change produced in the constitution is not affected by time." The periods he alludes to are from 25 to 53 years, so that we think, if the gentlemen who have taken up the other side of the question have no better proofs than those they have as yet advanced, we may safely set down their allegations as not proven.

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* Medical Gazette, vol. viii.

† Med. Chir. Trans. vol. xii. p. 336.

‡ Inquiry, and Edinburgh Medical and Surgical Journal, 1819.

Dr. Jenner's hypothesis of the identity of variola and the variolæ vaccinæ (to use his phrase) has been already alluded to; whether it be true or false is a matter rather curious, than of any practical utility. It will be enough to say, that the present phenomena of the two affections are materially different, and it is probable that an attempt now to trace their affinity would only result in rendering the *obscurum obscurius.*[*] A novel and interesting idea has, however, been more lately started by Dr. Thomson, viz., that varicella, modified small pox, horn pox, swine pox, stone pox, &c., are all only varieties of the common small pox. A modification of Dr. Thomson's views has since been proposed by Lichtenstädt,[†] of Breslau, viz., that varicella was originally a mild offshoot from variola, which has become gradually so weakened by transmission, as now to be incapable of producing small pox; but that it still occasionally arises directly from that disease, as at first. Dr. Thomson's hypothesis owed its origin to some inoculations performed by the late distinguished Dr. Hennen, with matter taken from an eruption which appeared upon his son, and was supposed at the time to be varicella. By these experiments, eruptive diseases of different degrees of severity, varying between the mildest varicella and severe small pox, were communicated to several individuals; at the same time Dr. T. observed, in different parts of Edinburgh, natural and modified small pox, and chicken pox, "co-existing in the same situations, and appearing in their progress to produce one another." A variolous epidemic was existing in Edinburgh at the time, and from the foregoing circumstances he was led to conceive, that all its various appearances in the different classes of persons whom it attacked, might be produced by the operation of one and the same contagion. On the other hand, Dr Möhl, of

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[*] The correctness of Jenner's views has been completely proved by the interesting experiments of Mr. Ceeley of Aylesbury; for a detailed account of which see the *Medical Press*, vol. ii p. 120. Mr. C. succeeded in communicating small pox to young cows by inoculation, the affection thus produced in these animals being, in all respects, similar to the true vaccine disease, and capable of being re-communicated to the human subject. [Note to Third Edition.]

[†] Hufeland's Journal, June, 1820.

Copenhagen,* has observed varicella at periods when there was no variolous epidemic, and again has seen it to occur sporadically at the same time with, but independently of the other disease. The question appears to turn upon the exact definition given to varicella, and we must confess that no description that we have seen would enable us to form a diagnosis between it and the vesicular variety of small pox. An able reviewer† has laid down, with a good deal of confidence, what he conceives to be certain diagnostic marks, the substance of which we shall give, but indeed with little hope of their being available in practice. The eruptive fever, he says, in varicella, is slight; Dr. Willan, however, has often seen it attended with convulsions; secondly, the eruption is vesicular from the beginning, or at least from the early part of the first day, not papular, as vesicular variola always is at first; thirdly, the tubercular basis of the vesicles is absent in varicella; yet Dr. Willan found "the sensation communicated to the finger, like that from a round seed flattened by pressure,"‡ and the reviewer admits that chicken pox sometimes acquires a tubercular base at a late period, while variola as often loses it: fourthly, varicella is to be known by the thinness and fragility of the covering of its vesicles, and by being found between the skin and the cuticle, while variola always exists in the true skin. With every disposition to acknowledge the talent shown in the review in question, we cannot but express our opinion, that the foregoing characters are rather the result of meditation in the closet than of observation by the bedside, and that as far as we have been able to see, ourselves, or examine into the opinions of others, the theory of Dr. Thomson appears to us to be still unimpugned.

Having now, we trust, entered, sufficiently in detail, upon the points embraced by our first query, it is time to return to the other two, which, however, will not require so lengthy a discussion.

The second inquiry proposed was—Has the present vaccine disease lost any of its properties by having passed through a number of human constitutions? The answer must, in a great measure, depend upon the case already made out for the actual protective properties of cow pox at the present time. In addition, we may mention that it is in the power of every person to satisfy himself that the vaccine vesicle of to-day is, in all respects, an original for the delineations of the same disease given by Jenner, in 1798; that we have no analogies in favor of deterioration, e. g. measles, scarlatina, plague, &c., are identical with the same maladies, according to the descriptions of the old authors; and that as small pox itself has not lost its virulence from time alone, we can have no solid reason for supposing that the same agent could have a material effect upon its opponent.

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* Op. Cit.

† Edin. Med. and Surg. Journal, April, 1820.

‡ On Vaccine Inoculation, p. 95.

Our third query was—Has the general employment of vaccination been found to increase the mortality of other diseases of infancy?

The affirmative of this question was advanced by Dr. Watt, of Glasgow, in the appendix to his Essay on Chin-cough, and in the Edinburgh Med. and Surg. Journal, vol. x., and his views passed current, both at home and abroad, until Mr. Roberton, of Manchester,* detected a fatal error in his calculations. Dr. Watt found, from the Glasgow tables, that from six years subsequent to 1782, the deaths, *under ten*, were 53.48 per cent. of the total deaths, whereas in the six years previous to 1812 they were 55.43 per cent. Hence he inferred that the mortality of children had not improved, and that as a manifest diminution had taken place through the abatement of small pox, this must have been compensated by a corresponding increase of deaths from other diseases of children. In his inference, Dr. Watt did not take into account the diminution that had taken place in the general mortality, nor the increase of the population; and accordingly we shall find, by referring the infantile deaths to the latter, both as found in Dr. W.'s tables, that in the early period the average annual mortality was one in 26.7, and the deaths *under ten*, 53.48 per cent.; that is, among every 1,000 of the population there died annually 37.45, *of whom* 20.03 were *under ten;* and that in the latter period the annual mortality was one in 40.8, and of the deaths 55.43 per cent. were *under ten;* that is, in every 1,000 inhabitants, 24.51 died annually, *of whom* 13.58 were *under ten;* showing in reality a decrease of deaths among children to two-thirds of what they were in the former period.† In corroboration of this view, we may quote Dr. Casper, who found that in Berlin, during the twenty years before 1799, the deaths under puberty were to the births as 51 to 100, while in the eight years succeeding 1814, they were only as 42 to 100; and that in the first period the deaths from measles and scarlatina were 14½ to 1,000; in the second, only 12½ to 1,000.‡

In conclusion, we shall advert to one other point, upon which we conceive a misconception has arisen. It has been asserted, that certain writers upon political economy declared themselves hostile to vaccination. We believe they did no such thing, but that the accusation was founded upon the opinion which they expressed, that the limits of increase in population were determined by those of the production of food, and that the numbers of mankind must maintain a ratio to the quantity of food that is to support them, notwithstanding the havoc of a pestilence; or the diminution of mortality produced by a powerful agent of health. As well as we recollect, Malthus has, in his late editions, expressly cleared himself from the imputation; but without at all entering into the doctrine of population, it must be obvious that no man in his senses, treating upon the means of improving the happiness of the community, could advocate the designed continuance of a disease that frequently leaves those who survive its attack, burdens to themselves and to society. If the political economist proposes to keep down the numbers of mankind, it must be by checking their production, in the first instance, not by cutting them off prematurely after they have been produced.

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* On Mortality of Children, 1827.

† The *coup de grace* has been given to Dr. Watt's error by an ingenious paper read lately before the Glasgow Medical Society by Mr. Cowan of that city.

‡ Op. citat.

CHAPTER XIV.

CONSTITUTIONAL DISEASES.

I.—SCROFULA.

A FULL discussion of this subject properly belongs to the province of writers upon the general practice of physic; and it would, therefore, be out of place, in the present work to devote a lengthened space to it. As, however, a scrofulous predisposition appears in many cases to be coeval with the existence of the individual subject to it, and as it may be kept dormant by proper management, or again, by an opposite course, may be induced in those not originally possessing it, so we feel it necessary to consider briefly its general nature, and the principles to be held in view in its treatment, whether preventive or remedial.

Symptoms and Marks of a Scrofulous Habit.—These have been laid down with great confidence, (although often with considerable difference in detail,) by systematic writers ever since the time of Galen. Any value, however, which we may be disposed to attach to them must be modified by the recollection, that scrofula can be excited by certain fortuitous occurrences in individuals who have no especial natural tendency towards it, and consequently we may meet with actual scrofula in persons who do not exhibit the ordinary characteristics of the strumous diathesis. These characteristics, as most universally agreed upon, are—a white and transparent skin, which, from its thinness making the color of the blood particularly visible through it, often gives the appearance of a blooming or hectic complexion; fair, or red, and soft hair; large and well opened eyes, with dilated pupils; thickness and liability to chapping of the upper lip and alæ nasi; large head and joints, but contracted chest; fingers long, and swollen at the extremities, with hooked nails; the muscular parts flabby and ill developed; the general surface of the skin delicate and subject to irritations, as from chafing or chilblains, and the whole constitution irritable and prone to febrile excitement from slight causes. The feelings and intellect often partake of the corporeal irritability—the person being ardent and warm-tempered, sometimes with a remarkable quickness and precocity of talent. In many cases we shall find the strumous diathesis existing in individuals of small stature and weak or deformed bodies; but its characteristics will often be present to a considerable extent, in persons large and well formed. Occasionally we shall find the skin, not delicate and transparent, but thick, sallow, and liable to eruptions, the person then usually having a heavy, stupid aspect, with full and drooping eye-lids. As might readily be anticipated, the condition of the constitution just described is likely to be accompanied by an imperfect performance of the functions of organic life. The circulation is usually languid and feeble, and the digestion so frequently deranged as to lead some writers to consider a peculiar form of dyspepsia as one of the most characteristic features of the strumous habit.* The collection of symptoms, however, to which the term *strumous dyspepsia* has been applied, we are rather inclined to designate as *tuberculous fever*. It is, in fact, nothing more than infantile remittent fever in a slow form, which, although often dependent upon the presence of worms or other source of irritation in the intestinal canal, may (much more frequently than is supposed) be occasioned by the development of scrofulous tubercles in some part of the system. The disease is well described by Dr. Todd in his paper already alluded to, but we object to his naming it *dyspepsia*, as being likely to have the effect of directing the attention exclusively to the abdomen as the seat of mischief; whereas we have reason to believe that the primary irritation may exist in the head or other parts. Dr. Todd admits that hydrocephalus and various other affections, may show themselves in strumous dyspepsia, but he considers these as secondary irritations, while our view differs from his, and from that generally adopted, in the essential point, that we believe symptoms identical with those of infantile remittent fever frequently attend upon a primary localization of scrofulous action in the brain and other parts as well as in the abdomen. For a description of the symptoms of *tubercular fever* we must refer to our section upon remittent fever at page 282, there being usually no appreciable difference between the affections. A great many other marks of scrofula will be found in express treatises upon the subject, but those we have given form the main and striking features of the *strumous diathesis.**

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* See article *Indigestion*, by Dr. Todd, in Cyc. Pract. Medicine.

When the disease is actually called into existence, it may affect, although with different degrees of frequency, almost every tissue in the body; and, indeed, it appears that any morbid condition occurring in a person with scrofulous diathesis, will be likely to be more or less modified by its influence. The susceptibility of different tissues to its invasion varies according to the age of the individual; children—to whom our observations have immediate reference—most commonly suffering the effects of scrofula in the mucous membranes, glands of the neck, and those of the mesentery. We have, however, seen true tubercular phthisis, with very extensive cavities in the lungs, in children under five years of age. The affection of the mesenteric glands has already been considered (as a disease peculiar to childhood), under the head of *Tabes Mesenterica;* and we shall now advert to the affections of the glands of the neck, and of the mucous membranes of the eye, ear, and the vagina. We shall do so briefly, however, as they are, by no means, peculiarly diseases of childhood.

a. Scrofula as it affects the Glands of the Neck.—These glands are seldom affected in children under two years of age, and are most commonly subject to the disease between the fifth year and puberty. When first affected, which often appears to be in consequence of irritation from eruptions on the scalp or behind the ears, or as a sequela of measles or scarlatina, the glands swell, and feel to the touch firm and fleshy. Their texture, however, is not at this period much altered, quicksilver passing readily through their vessels, as has been proved by the injections of Sömmering. By degrees, and often very slowly, the gland becomes larger and harder, parts of it sometimes being as firm as cartilage, and finally a process of softening takes place in particular spots, which, if then examined, would be found to contain a soft, yellowish white, and cheesy, tuberculous matter. The softening continues until a species of curdy, yellowish pus is formed, which slowly makes its way to the surface, often through several apertures, when an open scrofulous abscess results. The natural tendency of scrofulous glands, or tubercles, is to soften and produce a whey-like, purulent fluid: but they may attain a very large size, still continuing hard, and finally be absorbed without any suppuration, probably in consequence of some improvement in the state of the general health. Most commonly, several glands are affected simultaneously, or in quick succession, a chain of tumors being often formed along the entire side of the neck, or beneath the jaw from one side to the other.

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* This term and that of scrofulous diathesis or habit, we use throughout this article in precisely the same sense as Dr. (now Sir James) Clark, employs the term, *Tuberculous Cachexia* in his admirable *Treatise on Pulmonary Consumption and Scrofula*, a work which though published in 1835, we had not the pleasure of seeing until after the publication of the first edition of the present volume, but which we now refer to with peculiar satisfaction, as containing opinions identical with those which we ventured to advance upon the various subjects included in our chapters upon Physical and Moral Education. Upon these, as upon all other subjects to which he has directed his attention, Sir James Clark has shed a light from which we should have been delighted to borrow. [Note to Second Edition.]

After a scrofulous abscess has burst, a slow process of enlargement goes on in the opening, and an indolent sore is formed, which continues, frequently for a very long period, to discharge a thin fluid, containing curdy flakes and occasionally small masses of tuberculous matter. The sore is characterized by a thin, overhanging, livid margin, with pale and flabby, or indistinct granulations. There is seldom any pain or uneasiness. The sore remains indolent for a long time; or sometimes heals in one part, and breaks out afresh, or spreads to another. When cicatrices are formed, they are wrinkled, and irregular in appearance, often crossed by projecting bands of skin, and producing much deformity.*

b. Scrofulous Ophthalmia.—Strumous children are exceedingly liable to inflammation of the tunica conjunctiva of the eye, which puts on the following characters. The edges of the eyelids are at first slightly red and thickened, and the secretion of the Meibomian glands altered, so as to cause glueing together of the lids during sleep. On everting the lids, we find the conjunctiva covering them somewhat redder than natural; but the same membrane upon the eyeball has, at this time, probably nothing remarkable in its appearance, except its being traversed by a few enlarged vessels. The inflammation slowly increases, and the conjunctiva becomes gradually more vascular,—the eye watering, and being very intolerant of light. This latter symptom is usually so remarkable, that the disease may be known, even without looking at the eyes, by the stooped position in which the patient carries his head, for the purpose of diminishing, as much as possible, exposure of the eyes to light.

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* The disease sometimes, but more rarely, attacks other glands, as those of the groin or axilla; its progress, however, being similar to that just described.

As the disease goes on, a marked disposition to the formation of pustules is evinced. They appear upon the margins of the lids, and in the Meibomian follicles, in which situations they run into ulceration, and produce great irritation and distress. Pustules are also formed upon the conjunctiva of the eyeball, or upon the cornea, a pencil of red vessels being developed in connection with each. When this happens upon the cornea, a troublesome ulcer is likely to follow; a general dulness of that texture is also usually produced; or a permanent opacity of a part of it, to a greater or lesser extent, which may end in total blindness. We have frequently observed, in children, a form of ulceration of the cornea, notice of which we do not recollect to have seen in works upon the subject; it is a removal of a patch of the conjunctiva which covers the cornea, without the production of any opacity. It appears exactly as if a small portion of the membrane had been removed by a sharp chisel, leaving a distinct facet, sometimes level, and in other instances concave. An experienced eye will easily detect this lesion, by the peculiar reflection of the rays of light which it occasions; but frequently we can actually see the defect, only by looking at the part in profile. This condition may remain unaltered for a considerable length of time; and so far as our experience goes, local applications, especially those of a caustic nature, are always injurious.

c. *Scrofulous Disease of the Ear.*—The lining membrane of the external auditory passage is often the subject of inflammation in scrofulous children. The affection is quite analogous to that of the eyes, consisting in a slow inflammation of the membrane, attended by the formation of pustules, and protracted discharge of unhealthy, and often fetid pus. This form of disease is always to be looked upon as dangerous, as the inflammation may slowly extend to the internal ear, causing ulceration of the tympanum, and destruction of the auditory bones, thus producing incurable deafness. It also not unfrequently extends to the petrous portion of the temporal bone, and thence into the cavity of the skull, when convulsions and death are the certain and sudden result.

Ulcerations behind the ear, in the angle between it and the head, are common attendants upon the affection of the passage, and are often to be looked upon as a beneficial source of derivation with regard to the latter: they should not, therefore, be incautiously meddled with.

d. *Scrofulous discharges from the Vagina.*—Children of a strumous habit are liable to purulent or muco-purulent discharges from the vagina, which require to be understood by practitioners, who are often consulted respecting them, in consequence of unpleasant suspicions arising as to their being of a specific nature, and having been communicated by infection. Looked upon in this light, such discharges may become the subjects of legal investigation; and in every such case, no opinion should be given without the most careful examination as to their real nature. Other marks of a scrofulous diathesis will commonly be present, but they may not be very decidedly so; and the occurrence may appear to be a good deal connected with a deranged condition of the bowels. It is a very obstinate affection, and only yields to improvement of the general health.

Pathology of Scrofula.—A consideration of this subject involves questions of considerable difficulty, into which we cannot here enter at length, and shall therefore merely state what appear to us to be the most rational views upon the subject.

It does not appear that scrofula is the product of any peculiar virus, as direct attempts to propagate it by inoculation, have been unsuccessfully made by Kortum,* Goodlad,† Hebreard,‡ Le Pelletier,§ and others. We must, therefore, abandon this opinion of the older physicians, and seek for another more accordant with the present state of our knowledge.

From what we have already stated, it appears that the constitutions of some individuals are decidedly predisposed to the occurrence of scrofula; and that marks are recognizable, whereby we may estimate the existence of such predisposition. These marks are all such as denote a preponderance of the white tissues and fluids of the body over the red,—or, in other words, of the lymphatic over the arterial and venous system. Our physiological knowledge leads us to the inference, that the strength, and vitality, and capability of resisting disease, possessed by animals, (at least, warm-blooded animals,) is in a direct ratio with the preponderance of the red tissues and fluids in their bodies over the white; that, in fact, the white tissues have naturally a lower degree of those qualities than the red,—and the more they abound in the system, in relation to the others, the less power will there be for struggling against morbid conditions.

It appears, also, that individuals who do not naturally possess the marks of a strumous diathesis, may become scrofulous by the operation of certain external causes, and that these are such as favor the production of a preponderance of the white over the red tissues, e. g. confinement, in a damp, unhealthy situation, with defective diet and a diminution in the supply of solar light and fresh air. Whoever looks upon the blanched aspect of hand-loom weavers, or of the youthful inhabitants of cellars, in some of our confined streets, will be at no loss to understand the operation of these causes in producing, at least a diminution of the redness of health; and medical men know that such individuals are very prone to scrofulous disease. Animals, also, taken into confinement from a wild state, frequently fall victims to scrofula—most of our parrots, monkeys, and tame rabbits, dying of tubercular consumption: while again, in the vegetable kingdom, an analogy is furnished with regard to the effects of want of light and air, in causing increase of the white tissues, by the appearance of any plant which has grown in a dark, confined situation. If, then, we have the marks of a scrofulous predisposition, identical with those of a preponderance of white tissues, and if we find also that the same causes which produce the latter state, may also produce the former, we have some warrant for inferring that the scrofulous diathesis is nothing more than a state of general ill-health occasioned by a deficiency in the proper supply of red blood, and consequent preponderance of white fluids and tissues; and that the different forms of scrofula are probably but local exhibitions of irritation, modified by the predisposition in question; but which irritations, if occurring in a healthy subject, would in all likelihood either be repelled without injury, or merely produce common inflammation.

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* De Vitio Scrofuloso, Lemgov. 1798.

† On the Lymphatic System, Lond 8vo.

‡ Dissert. sur les Tumeurs Scrof. Par. 8vo.

§ Sur la Maladie Scrofuleuse, Par. 1830.

Upon these principles, we can account for the hereditary transmission of the disease, and for its occasionally passing over generations. It accords with any knowledge we possess respecting re-production, that peculiarities of structure have a tendency to be communicated from parent to offspring; therefore, we should expect the deficiency in red tissues, constituting the scrofulous diathesis, to be bequeathed by a strumous father or mother to their child, and accordingly we find that it frequently so happens. On the other hand, we know that fortuitous circumstances may produce a like condition of the two sets of tissues in individuals not born with it; and so we see how scrofula may arise independently of hereditary descent. Again, every one is aware of the increase of ruddiness and strength effected in delicate persons by active exercise in the open air,—this ruddiness being nothing more than an evidence of an increase in their store of red blood; hence we know why scrofula may pass over a generation better circumstanced as to air and employment than that which preceded it; and we are also taught to hope that, by suitable means much may

be done, both in the prevention
human race.*

With respect to the essential
the most certain is the producti
is defined by Dr. Carswell † to l
grey, opaque, unorganized su
and composition of which, var
which it is formed, and the per
The seat in which this matter
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His view, however, appears to
already advanced, as to the pat
cous systems require for the discharge of their functions, a large share of red blood, and a high degree of vitality; consequently it is to be expected that they will suffer soonest and most severely from any minus state of the constitution in these particulars.

Although the deposition of tuberculous matter is a sure evidence of scrofula being present, still we must admit the disease to exist, although no such formation may have taken place. In the affections of the eye, ear, and vagina, for example, there is no tuberculous matter deposited; yet we cannot doubt that they are strumous, both on account of the manner of their progress, and of the constitutions of the individuals whom they affect.

It has been supposed by some, that tubercle always has its origin in inflammation; and were it not that the authors of this theory have endeavored to form for it an unlawful and dangerous union with practice, by recommending depletive measures for the cure of tuberculous disease, we should pass it over as one of those idle disputes about words unfortunately so common among physicians. Our opinion upon the subject may be inferred from what we have already stated; we believe that irritations which would produce no effect upon the healthy, originate tubercle in the scrofulous; and also that lesions capable of exciting inflammation in the former, would excite tuberculous deposition in the latter. The cure of inflammation in the healthy, however, is to be effected by the abstraction from their system of red blood; while the cause of the scrofulous disposition we believe to be a deficiency in the same fluid—consequently, it cannot be cured by making that deficiency more considerable, and therefore, (in a therapeutical sense, at least,) is not to be looked upon as inflammation.

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* Mr. Carmichael in his admirable clinical lectures, while he rejects the idea of scrofula being occasioned by any peculiar poison transmissible from parent to child, says:—"No doubt numbers come into the world predisposed to the disease; but these are the children of sickly or debilitated parents; no matter from what cause their debility may have arisen. Thus the offspring of the valetudinarian — the dissipated debauchee—the drunken sot—or the old gouty man of pleasure, may be esteeemed predisposed to scrofula. Even the children of old men, though healthy, appear to be in this predicament. A few years since, I was consulted on account of two children, a boy and a girl, under ten years of age—the one had caries of the vertebræ—and the other hip joint disease in its second stage. The lady, under whose care they were, who was herself apparently fifty years of age, told me that these children were her brother and sister — seeing some surprise in my countenance, she added: 'but by different mothers. My father, when eighty years of age, thought proper to marry a second time; the family he had by his first wife are, like myself, all stout and healthy (indeed she appeared the very personification of stoutness) while the family he had by his second wife, like those you see before you, are all mere sickly blights.' I then inquired if the mother of the latter was healthy, and was told that she was a remarkably fine healthy looking woman, and nursed three children herself—the inference is obvious." Mr. C. also strongly advocates the opinion that close intermarriages between blood relations tend much to the production of a scrofulous progeny. See the *Medical Press*, vol. iii. p. 3. [Note to Third Edition.]

† Illustrations, &c. London, 1833.

‡ Mr. Carmichael conceives the tubercle of the lungs to be essentially different from the matter of scrofulous tumors; according to his opinion, the former is to be considered as an independent parasitic formation. See his lectures in the 3d vol. of the *Medical Press, passim.* [Note to Third Edition.]

Preventive Treatment.—Viewing the scrofulous diathesis as a minus state of the red fluids and tissues, the obvious means of preventing the development of the evil effects of this condition must be, to restore the system to its healthy balance, and so to preserve it. How this is to be attempted has been already considered at some length, in the chapters upon the *Management and Education of Children*, and need not be again dwelt upon. What we want to accomplish is, the establishment of a good state of health; and this can only be arrived at by a careful working out of the principles laid down in those chapters under the heads of food, clothing, &c. &c. In cases of a marked scrofulous predisposition, we may recommend, in addition, a residence at the sea side during three or four of the summer months, which, without supposing the sea to possess any specific, anti-strumous qualities, must certainly be looked upon as likely to produce very beneficial tonic effects. No specific medical treatment is required or warranted for the *prevention* of scrofula.

Curative Treatment of Scrofula.—This is to be based upon principles precisely similar to those of the preventive treatment. The general health must be improved by means suitable to the particular case, and all causes of local irritation must be, as far as possible, removed. The means of working out these principles will, of course, vary according to circumstances. When the digestive system is out of order, it must be improved by alterative medicines, and perhaps gentle aperients; but nothing in the shape of drastic purgatives should ever be administered to scrofulous subjects. The improvement we want to effect in the digestive system is, the establishment of a good appetite and digestion; and this will, in most cases, be done, with greatest certainty, by preventing errors in diet, giving a sufficient quantity of light nutritious food, partly of the animal kind; but never oppressing the stomach: when wine or malt liquors can be taken without exciting fever, they should be allowed; but with children such articles are seldom required, and often do harm by their stimulant effects. Constant exercise, and free exposure to the air, and solar influence, but with a sufficiency of warm clothing, are essentials in the treatment of scrofula; and if residence near the sea during the summer months, or short sea voyages under comfortable circumstances, can be accomplished, much good may be expected to result. Residence in a mild and equable climate during the winter, is also desirable; but very warm latitudes are not suitable for the scrofulous, and the want of many British comforts, (as fires, comfortable beds, well-aired linen, &c.) incident to a residence on the Continent, renders a removal to the southern parts of Europe a matter of very questionable prudence with persons suffering from these disorders.

As to medicines, we know of none that possess specific anti-strumous properties; and in addition to the mild alteratives already alluded to, we would only recommend a trial of such as are considered to possess tonic properties, keeping a careful watch, however, over their effects, and never pushing them in the hope of their being specific cures, after they have appeared to disagree with the system. The tonic which we have found most beneficial, and approaching nearest to a specific, is certainly iodine; and this we would give in almost every case of scrofula, under the restrictions and in the mode recommended at p. 130.* Sarsaparilla will also be found of service, and may be given in conjunction with iodine; as may also the light bitters when the state of the stomach requires treatment. As for the numerous specifics recommended in this disease, e. g. muriate of baryta, hemlock, iron, &c., we consider them to possess no more peculiar virtues than as they may happen to have tonic, or anodyne, or the like qualities, which may be useful in particular cases.†

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* The use of ioduretted baths has been much recommended by M. Lugol in the treatment of scrofula. We give his formula for baths for children between four and seven years of age:

Water. Quarts.	Iodine. Troy grains.	Hydriodate of Potash. Troy grains.
36.	30 to 36.	60 to 72.

† In a letter lately addressed to the Royal Academy of Medicine, of Paris, by M. Coster, the virtues of iron, as a preventive of the development of scrofula, are highly extolled. Two years ago, M. C. placed a number of dogs, rabbits, &c., in the circumstances most favorable to the development of the scrofulous diathesis. Thus, many of the unfortunate animals were shut up in dungeons, without light, or space for motion, and exposed to a moist cold by means of wet sponges which were hung up in the cages. Some of the animals placed in these conditions, were fed on their

Local Treatment of Scrofula.—When scrofulous glands enlarge slowly and remain indolent, we believe it is better to use no local treatment, and especially to avoid exciting them by frictions with greasy substances. We cannot have much hope of dispersing them by such means; and if we could do so, without at the same time changing the scrofulous disposition in the constitution, there is reason to fear that, by removing what furnishes a sort of counter-irritation upon the external surface, we may be only favoring the development of the disease in some internal organ. When there is much pain or irritation in the tumor, we may have occasion to apply a leech or two, and to use emollient warm applications, for the purpose of relieving the tension. If matter be formed, it becomes a question whether or not an opening should be made for its escape. We believe this should not be done unless there is more than ordinary pain or tension, or the skin is manifestly on the point of bursting. It is hoped by some that an early opening may be the means of preventing an unsightly scar; but it does not always do so; and on the other hand, large tumors have been altogether absorbed without breaking, even after the formation of matter.

After the abscess has been opened or has burst, if the discharge be considerable, we may cover it, for a day or two, with a poultice, and subsequently dress it with a bit of dry lint or finely carded cotton, avoiding all greasy applications. The ulcer when indolent, as it usually is, may be stimulated by touching its edges with nitrate of silver; and if irritable, the same treatment, followed by a poultice of bread and water, or hemlock leaves, or sea weed, will be found serviceable. The healing of these ulcers is commonly very tedious, and will not be

ordinary diet; others were fed with *ferruginous* bread, containing half an ounce of carbonate of iron, to the pound. All the former became ill, the greater part tuberculous, but not one of those fed on bread containing iron presented a trace of tubercles.—*Bull. de l'Acad. Jan.* 31, 1840. [Note to Third Edition]

M. Coster has since published his Experimental Researches on the generation and prophylaxis of tubercular diseases at greater length (see *Gazette des Hospitaux*, and translation in the *Medical Press*, vol. vi p. 247.) The views of M. C. regarding the nature of scrofula are very similar to those we have put forward above. He considers the disease to be constitutional, and the result of a special organization, either hereditary or acquired. "Tubercles," he correctly observes, "wherever situated, do not constitute the disease; they are but the expression, the manifestation of a pathological disposition, so universal that it influences every molecule of the system, communicating to the entire economy, as to each of its constituent atoms, a mode of existence peculiar to itself, and often cognisable in the physical and moral condition of the individual." The intimate nature of this pathological disposition M. C. does not profess to explain, nor does he offer any theory to account for the operation of iron in modifying it. We confess, the moderation and soundness of his arguments, as well as the detail of his experiments, and the few trials of his plan which we have had an opportunity of making, all combine to induce us to doubt the correctness of our former opinion as to the non-specific properties of iron. M. Coster has, to say the least, made a case to warrant its careful and extensive trial, both as a preventive and curative agent. [Note to Fourth Edition.]

perfectly accomplished unless an improvement is effected in the constitution; or scrofulous disease breaks out elsewhere.

After the ulcer has healed, a hard tumor will sometimes remain; and if this be perfectly free from pain, or other sign of irritation, we may attempt its removal by the employment of small blisters, or frictions with discutient ointments. It is at this time that the different ointments of iodine may be safely used; but if any pain or irritation arise, they should at once be discontinued.

In treating scrofulous ophthalmia, much attention should be directed to the state of the constitution; but local management will also be found of considerable importance. In the first place, a broad, green silk shade should be placed upon the patient, in such a way as to stand out well from the forehead, and admit the access of air to the eyes, while it intercepts the direct rays of light. This management of the shade is of great consequence; as those usually employed, which are small and lie close to the eyes, do more harm than good. When there is much redness or pain, a poultice of bread and cold water, or of alum curd, enclosed in a muslin bag, should be placed over the closed eye at night. The best eye water is a solution of sulphate of zinc, or alum (three or four grains to the ounce) in rose water. If the lids stick together at night, much relief will be afforded by anointing them at bedtime with a small portion of dilute citrine ointment, or of oxide of zinc ointment, made with five grains of the oxide to two drachms of lard, and with the addition of ten drops of laudanum.

When the affection is indolent, small blisters behind the ears will often be of service. If the conjunctiva becomes granular in old cases, the application of caustics will be required, as the sulphate of copper, or nitrate of silver.

After all, however, nothing is done, if we do not improve the state of the system by the general means already laid down. We have in a very great number of instances, tried the experiment of treating the general health alone, using nothing local except the shade and a poultice of cold bread and water; and we are certainly of opinion that a greater number of cases will be cured in this way, than if the most careful local treatment were combined. We have not unfrequently seen ulcers, and even considerable opacities of the cornea, disappear altogether under the use of iodine, without any local treatment whatsoever.

Scrofulous disease of the ear requires no direct local treatment, except cleanliness; but will often be benefited by exciting counter-irritation behind the ear, the best way to do which is, to place a piece of woollen thread, smeared with blistering ointment, in the angle between the ear and the scalp.

In scrofulous discharges from the vagina in children, we have repeatedly tried stimulant and astringent lotions and injections, without effect. We believe they can be efficiently treated only by general means.

II.—RICKETS—(RACHITIS).

This disease, which is now, happily, becoming rare, was once so prevalent in these countries as to be termed the English disease, a name (*Die Englische Krankheit*) which it still retains among the Germans.

It does not affect the young infant, but commonly appears about the period of the first dentition,—at least, its effects become then for the first time, manifest, when the child commences to support the weight of its body upon its limbs.

Symptoms.—Before any local characteristics of the disease make their appearance, the child's health will be observed to be deranged: it is peevish and languid; the skin becomes dry and rough; the flesh soft and flabby; the countenance pallid and delicate; the appetite uncertain, and occasionally depraved (unnatural food being sought for); the digestion is at the same time impaired, the bowels being irregular, and the stools and urine unhealthy in their appearance; the abdomen is large, while the rest of the body and the limbs become emaciated. Along with these symptoms, a general febrile excitement is present, similar to that which has been already described under the name of remittent fever, and which, in the last section, has been named *tuberculous fever.*

After these symptoms have been manifesting themselves for some time, the head will be observed to be unnaturally large, and the forehead prominent, while a defective ossification of the bones of the head will be proved by the open state of the fontanelles and sutures. The ends of the long bones at the ancles and wrists become swollen into knobs, which seem larger than they really are from the contrast with the shrunken limbs; the sternal ends of the ribs may be also enlarged and spongy. That the bones are softer than natural, and incapable of supporting the weight of the body, or the action of muscles, is shown by the bending of the legs, thighs, and arms, and narrowing of the chest by the straightening of the ribs and projection of the sternum forwards. As the disease goes on, the pelvis and spine partake in the deformity, which may be carried to such a pitch as to destroy life by interrupting the performance of the functions of the different viscera. The teeth also share in the general disease of the osseous system, coming out slowly, and prematurely suffering decay.

It has been observed, that the mental faculties of ricketty children are, usually, quick and precocious; but this is not at all uniformly so, and is probably not characteristic of the disease, being explainable by the greater degree of attention likely to be paid, by its adult relatives, to the conversation of a delicate child, which is unable to join in the active sports of younger companions. A species of acute rickets has been noticed by authors, in which all the bones of the skeleton are said to have become softened in the space of a few weeks.

Pathology.—The immediate cause of rickets is a deficiency in the earthy matter of the bones, which consequently do not possess the natural and requisite firmness. "Dr. John Davy found 100 parts of the dry tibia of a healthy subject of fifteen, to yield 46.4 of animal matter, and 53.6 of earthy; while the same quantity of the dry tibia of a rickety child contained 74 parts of animal, and 26 of earthy substance."* The various marks of disease in the cavities and viscera, which are found in the bodies of those who die ricketty, are merely accidental, and not to be considered as in any way essential to the disease.

The remote causes of rickets are identical with those which produce scrofula; so much so, that by some it is considered as merely a form of that disease. It certainly is often combined with unequivocal marks of a scrofulous diathesis, and to make any difference in the general pathology of the two affections is probably but disputing about words. Bad nursing; unhealthy, ill-ventilated, damp dwellings; deficiencies in cleanliness, food, exercise, and exposure to light and air—any thing, in fact, which prevents a healthy nutrition, may produce rickets. It appears also to be endemic in certain localities, and to be sometimes transmitted by hereditary descent.

Diagnosis.—There can be no mistake about the disease, when its local characters appear. Its early symptoms, however, may be similar to those of *tabes mesenterica*, or simple remittent fever, and can only be determined to belong to rickets, by the result.

Prognosis.—This is favorable when the disease is noticed early, and the cause admits of being removed. Danger is to be apprehended when the deformity is so considerable as to impede any of the vital functions; and even if it does not reach this extent, it may be sufficient to cause a life of protracted misery, and liability to disease. About the age of puberty, a marked improvement often takes place in the health of ricketty persons; and in those who, with an originally healthy constitution, have been subjected to the disease by bad nursing, a most surprising improvement will often take place in the form of the limbs, during recovery. Of course, any disease affecting a child while in a ricketty condition may be expected to be particularly severe, in consequence of the deficiency of strength in the general system.

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* Cyc. Pract. Med. Art. Rickets.

Treatment.—We have little to say, under this head, beyond what we have already said respecting the treatment of scrofula, and in the chapters upon the Management and Education of Children. Attention similar to that recommended on those occasions must be paid to the ricketty child, with the view of improving its health, which is the great principle to be followed out in the preventive or remedial treatment of rickets.* Any symptoms of fever, derangement of bowels, &c., which attend, must be met by suitable means; and during the treatment we shall frequently have occasion to employ gentle, alterative aperients. When the digestive system has been set to rights, tonics, both internal and external, will be required: among the latter, the tepid salt water bath, and friction will generally prove serviceable; and among the former, iodine and the different preparations of iron hold the first place. For the modes of administering these medicines, we must refer to the chapter on Therapeutics.

In holding and carrying a ricketty child, the greatest attention should be paid to the avoidance of undue pressure upon any part, especially the chest. It must be remembered that the bones are in a flexible and pliant condition, and that pressure carelessly continued in the same situation, will be very likely to alter their shape. When recovery is taking place, and the child is sufficiently old, well-regulated gymnastic exercises will often produce very good effects in expanding the chest, and straightening the limbs and spine; but they should be used very cautiously, and always with due regard to the delicate health and impaired strength of the patient. Dupuytren was in the habit of placing a child with a deformed chest, with its back against a flat resisting body, and then pressing with the expanded palm of the hand upon the sternum, so as to flatten the thorax from before backwards, and increase the convexity of the ribs from side to side. By repeating this practice from day to day, it is possible to effect much improvement in the shape of the chest; but force sufficient to cause pain should never be employed. All instruments for straightening the limbs, or supporting the spine, are worse than useless, as they prevent the action and development of the muscles, which afford the only true means of restoring strength and symmetry.

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* Ricketty children sometimes show a remarkable fondness for common salt, which should be indulged to a reasonable extent. This reminds us of having omitted, in speaking of the food of children, to dwell upon the necessity and advantage of giving a sufficient supply of this condiment. Sufficient salt should always be put in the broths, and given with the animal food allowed to children, as it contributes much to the healthy performance of digestion, and is also a powerful preventive of intestinal worms.

III.—SYPHILIS.

The venereal disease may be communicated to the young child in three ways. 1st, The fœtus may be contaminated, while yet in the womb of its mother; 2nd, The infant may receive infection from the nipple of a diseased nurse; and, 3rd, It may be infected during its birth, the mother at the time laboring under primary symptoms of the disease. By most authors it has been supposed, that the two latter are the only modes by which the child can be infected; but, strange as it may appear, the first mentioned has been, in our experience (which has not been inconsiderable), by far the most usual; and we have not in our recollection any case decidedly proving the occurrence of the third. Whether or not this is explainable by the supposition of Jahn, that the *vernix caseósa* effectually prevents contamination by the skin, we shall not at present attempt to decide.

Transmission by the nipple of the nurse, we have frequently observed, and have known a whole family to be infected in this way,—the nurse having first received the disease from the mouth of a syphilitic nurseling. The most ordinary manner, however, in which syphilis is communicated to an infant, is by the first mode; and it happens, commonly, in one of the following ways. One or both parents may have the disease at the time of the conception of the child, or they may have had it previously, and perhaps, at the period in question, present no sign of ill-health whatsoever. Under either of these circumstances, a child may be born, apparently healthy, and continue so for an uncertain period, (varying from a fortnight to five or six months,) when marks of syphilis may show themselves: the most usual period for the disease to appear is, according to our experience, from the third to the fifth week. In this way the symptoms may be developed, in several successive children of the same parents; but usually, such cases are alternated with miscarriages, or premature births of children, dead, and covered with syphilitic eruption; or all these occurrences may take place in the same family: for example, a woman may miscarry once or twice; may then produce a dead syphilitic child; and subsequently give birth to one, apparently healthy, but showing disease when it has attained the age of four or five weeks. There is no regular succession in the occurrence of these different events, as they indifferently precede or follow each other.

During the whole period of the production of these diseased children, both parents may appear perfectly healthy, and one of them may never have had any sign of the disease. We have in our recollection many instances in which miscarriages, premature births, and syphilitic children have continued to succeed each other, although the mother had been always healthy, and the father had no trace of disease, perhaps, for years before his marriage. We have now before us, notes of the case of a syphilitic child, whose mother had been infected by a former husband, and, to all appearance, cured, five years before its birth,—the father of the child (her second husband) being in good health. Our experience would enable us to adduce many curious facts, bearing upon this subject, which, however, would be unsuitable in the present work; and we shall now proceed to consider, the

Symptoms.—We have stated that children may suffer from syphilis, while yet in the mother's womb; in which case they are generally born premature and dead, often putrid. The appearances on the body of the child are not generally of a decidedly pathognomonic character; we have seen an eruption of copper-colored blotches; but more usually there is merely a desquamation of the entire cuticle. When the child is dead, it has commonly been so for some weeks before birth, and has consequently become so putrid as to prevent our recognizing any marks except those of decomposition. We have not, therefore, in the mere fact of the birth of dead and putrid children, evidence sufficient to enable us to pronounce upon the existence of a syphilitic taint in the constitution of the parents; and, unless the history throws distinct light upon the case, it can only be satisfactorily cleared up by the birth of a living child, and its subsequently showing symptoms of syphilis. Under these circumstances, the child appears healthy for an uncertain period (from a fortnight to five or six months) after birth. The first distinct symptom usually is the occurrence of a peculiar mode of breathing through the nose, known by nurses as *the snuffles.* At the commencement, this is attributed to cold, and seldom attended to until the eruption appears: in the interim, however, the child's health is much affected, and without any apparent reason. It has no bowel complaint, and is not undergoing dentition, but yet wastes away, and is feverish, fretful, and pallid. In about a fortnight, an eruption comes out rather suddenly, at first upon the lower extremities and buttocks, and subsequently upon the face and body.

The practitioner seldom sees the child until this eruption has been for some time in existence, and has changed its original characters. It appears, however, first in the form of copper-colored blotches, about the size of a split pea, and slightly raised above the level of the skin; these are in a slight degree moist upon the surface, and, in situations exposed to the air, they soon become scaly, and subsequently, are converted into dark-yellowish scabs. Where portions of skin are naturally in contact, as between the buttocks, in the wrinkles of the neck, &c., scales are not formed—but raised, condylomatous sores. As the disease advances, the skin, in the interspaces between the scabs, becomes, throughout, of a copper color; and perpendicular fissures are formed in the lips, giving the mouth a very peculiar and characteristic appearance, which cannot be verbally described, but, to those familiar with the disease, is in itself diagnostic of its real nature. The voice at this period becomes feeble and stridulous; the inside of the mouth often covered with aphthæ; extreme emaciation attends; and, if medical aid be not afforded, the child is reduced to a state of excessive debility, and dies, covered with disgusting scabs and ulcerations.

Such is the ordinary course of the disease; and, so far as we have observed it, the syphilis of children presents little variety of form. In one case, we saw a well-marked syphilitic iritis in a child about a year old, whose father had at the time a tubercular eruption: the mother stated herself never to have had any syphilitic complaint.

Syphilis of children may be, to all appearance, cured by treatment, and will again return: this may occur several times, at intervals of a month or two, each relapse being milder than the preceding one, until, at length, the taint is worn out of the system.

When the infection has been communicated in the second mode, viz. from sores upon the nipple of the nurse, ulcers will, in the first instance, be formed in the mouth of the child, but subsequently the characters are similar to those we have just described. The ulcers in the mouth are often overlooked, or considered as aphthous: we are not able to assign to them any characteristic marks whereby they may be diagnosed.

The *Diagnosis* of the disease is to be derived partly from its history; but in investigating this, the greatest caution is required, as a hint of any suspicion upon the subject might, in many instances, be productive of the most unhappy domestic results. The tact of the physician will therefore be called into play, for the purpose of eliciting the information he requires, without committing himself to an opinion, or exciting unpleasant suspicions in the minds of those with whom he is dealing. To persons experienced in the management of the disease, the characters of the eruption, as just described, will usually be sufficient to declare its nature, and obviate the necessity for minute inquiries into its history; but knowledge of this kind cannot be acquired, except by long-continued personal observation of patients. *The snuffles* of syphilis have nothing at first to distinguish them from those of common catarrh; and in this stage it cannot be diagnosed, except by a knowledge of its having previously occurred with other children of the same family. The disease with which the eruption is most likely to be confounded is common itch, which, in the delicate skin of the child, may assume a frightfully severe form. It is to be known from syphilis by its pustular character, by the itchiness which it occasions, and by the absence of the copper color of the skin, and the peculiar fissured appearance of the mouth. Itch is also commonly communicated to the attendants of the child, in whom its characters will be too well marked to admit of any mistake; and by an observation of this circumstance, the diagnosis will be often much assisted.

The *Prognosis* is always favorable, when the case is seen early and properly treated; few diseases being more under the influence of medicine. If left to itself, however, syphilis infantum is certainly fatal. We are also to recollect that even when treated in the most judicious manner, it is liable to relapse, perhaps more than once, after an apparently complete cure.

The *Treatment* is exceedingly simple,—mercury being always required, and, when judiciously exhibited, seldom failing to produce a beneficial effect. A question has arisen as to the propriety of giving mercury directly to the child itself, or indirectly through the nurse: the former is the plan we always adopt,—the child bearing the medicine well, and experience having taught us that the latter method alone is not sufficient to effect a cure.

The expediency of putting the parents under the influence of mercury, with a view to the prevention of a recurrence of the disease in future children, involves several distinct considerations. If either parent exhibits unequivocal marks of syphilis, there can be no doubt of the propriety of adopting suitable means of cure. Frequently, however, we shall find no existing symptoms of the kind; and then we are to consider whether it will be advisable to mercurialize one or both. If both have been formerly infected, it is our opinion that both should take mercury: if one has been affected, and the other apparently not, there is more difficulty in the case. If it be the female alone who has had the disease, as in the case of the widow whom we have already alluded to, we think it will probably be sufficient to treat her: but under opposite conditions, we are not so much inclined to hope for success from treatment merely of the male. In other words, we are inclined to suspect that a taint may be communicated to the female parent, without its being rendered manifest by any outward marks. The subject, however, is in great obscurity, and requires many more observations for its elucidation.

Our plan of treating a child is, to administer from one to two grains of hydrargyrum cum cretâ, two or three times a day (according to the age), until the eruption and snuffles disappear. The child usually fattens under this treatment; and salivation is never produced, at least we have never seen it, in a child under three years of age. Should the mercury affect the bowels, which sometimes happens, we must combine with each dose from half a grain to a grain of Dover's powder, or of the powder of chalk and opium. The time required for treatment is from six weeks to two or three months, and the medicine should always be continued for two or three weeks after every symptom has disappeared: even when this precaution has been observed, the disease may return, and the mercurial treatment must be, again and again, resumed. The sores about the anus, and in other similar situations, will often be benefited by the application of black wash, or of dilute citrine ointment; and when they become very indolent, it may be necessary, towards the termination of the treatment, to stimulate them with nitrate of silver, or sulphate of copper.

In addition to the foregoing treatment, when the mother is suckling her own child (and, for obvious reasons, it never should be given to a strange nurse), it will be well to treat her with alteratives,—as, for example, sarsaparilla; but unless she labors under actual syphilitic symptoms, the giving of mercury to her should not be thought of until the child is weaned, as by affecting her general health, it would be likely to deteriorate her qualities as a nurse.

IV.—PURPURA.

A form of this affection is not uncommonly met with among the children of the poor, in large cities, and has been noticed by Heberden in his Commentaries. It has been included by Willan among the exanthemata; but the mode of its appearance, without distinct preceding fever, as well as its duration and course, sufficiently distinguish it from those diseases, with which indeed it has nothing in common, except that it engages the cutaneous surface.

The form of purpura which we have observed in children is that denominated by Willan *purpura simplex.*

Symptoms.—It appears in the form of purple spots, varying from the size of flea-bites (for which they are often mistaken), to that of a shilling, or even larger. These are not elevated above the surface, but consist of small extravasations of blood in the tissue of the skin: they are not productive of any local uneasiness whatsoever. The appearance of the spots is not preceded by any distinct febrile reaction; but the child will be always found to have been somewhat out of health previously: it has been pallid and delicate looking, with a quickened pulse, and more or less derangement of the bowels; and frequently the subject, for some time, of an attack of remittent fever. Often, the child will be brought to us for some other disease, and we shall be the first to notice the purpural appearance, which has been previously considered by the parents to be merely the effect of flea-bites. Should the disease run on, in consequence of injudicious treatment, or of a continued exposure to its original cause, slight pressure will produce vibices; larger extravasations of blood will be formed upon the surface; hæmorrhages will take place from the various passages, and the case, in short, will become one of true *purpura hæmorrhagica.*

Pathology.—This disease, if not identical with scurvy, is at least very analogous to it, and the proximate cause of both is probably the same. Into a consideration of this subject, however, involving, as it does, the whole dispute between the humoralists and solidists, it would be out of place here to enter; and we shall only mention the conditions which we have seen most frequently associated with the purpura of children. The subjects of the disease have been always, according to our observations, living in situations unhealthy, damp, and imperfectly supplied with light and air; their diet has also been scanty, or unsuitable to their age. Dr. Graves justly observes,* that he has usually found that such children were fed upon salt provisions, as bacon, salted herrings, &c.; and without making any inquiries upon the subject, we shall frequently perceive, by the peculiar odor of these patients, that the latter article has been a chief constituent of their diet.

The chief point in the *Diagnosis* of purpura simplex is, to discriminate the spots from flea-bites: these latter may be recognised by their redder color, and by the central puncture produced by the bite, as well as by their more rapid disappearance from the skin.

When a suitable dietetic and general treatment can be adopted, the disease, if uncomplicated, readily yields; but purpura always indicates a bad state of constitution, and betokens evil, when it occurs in the course of other disorders.

The *Treatment* must consist less in the administration of medicines than in the improvement of diet and regimen. In place of tea and salted provisions; milk, fresh meat, and vegetables should constitute the child's food: it should live in an airy situation, and be made to exercise freely in the open air during a large portion of each day. The surface of the body should be sponged, night and morning, with tepid vinegar and water, and the strictest attention paid to cleanliness.

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* Dub. Med. Jour. vol. iii.

With respect to medical treatment, the bowels, if deranged, should, in the first instance, be set to rights: and for this purpose some mild alterative aperient (see pp. 160—162,) will usually be required. We have sometimes given, with advantage, small doses of quinine with the mineral acids; and Dr. Graves has found benefit to arise from the administration of citric acid, to the amount of half a drachm daily. Usually, however, attention to the bowels, with regulation of the diet, &c., will be sufficient to effect a cure without any further medical interference being required.

V.—PEMPHIGUS GANGRENOSUS—(BURNT HOLES.)

A variety of pemphigus, to which the epithet *gangrenosus* has been applied by Dr. Stokes the elder,* is not uncommonly met with among children, and constitutes a very dangerous disease. It occurs usually within the first five years of life, chiefly among the children of the poor, who live in damp, unhealthy situations; and it sometimes assumes an epidemic character.

Our account of *the Symptoms* we shall take, in a good measure, from the essay of Dr. Stokes, who first accurately described them, adding any thing which our own experience may suggest. "The approach of this disorder is sometimes, though rarely, denoted by a livid suffusion, like that of erysipelas, slightly elevated. It more frequently happens, however, that the complaint comes on in perfect health. One or more vesicles appear, mostly larger than the best distinct small pox: these increase for two or three days, burst, and discharge a thin fluid, having a disagreeable smell, limpid in most cases, sometimes whitish, and sometimes yellowish; the latter less dangerous: usually, the weaker the child's constitution is, the thinner is the matter.† Before or after breaking, the vesicles run together: the sore becomes painful, with loss of substance, and a thin, fetid, ichorous discharge; the edges of the ulcer are undermined, and it spreads quickly." We have sometimes observed the sore to put on a very peculiar appearance, being clean, but perfectly destitute of granulations, without any surrounding inflammation, and seeming exactly as if a portion had been scooped out of the sound skin with a sharp gouge. The surface of the sore is, in other cases, livid and sloughy, true gangrene actually taking place in it.

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* Dub. Med. and Phys. Essays, vol i. Dublin, 1808.

† Dr. M'Adam, in one case, found this matter so acrid as to corrode sound skin upon which it had dropped. See Dub. Med. and Phys. Essays, vol. i. 1808.

"The most usual seats of the disease are, behind the ears, sometimes on the hands or feet, on the private parts, (seldom on the arm pit,) the breast, folds of the thighs, lower belly, on the inside of the mouth or lips. If the sores are behind the ears, they destroy the connection of the posterior cartilage with the cranium; they spread to the meatus auditorius: to the eyes, the sight of which seemed, in a few cases, to have been destroyed one or two days before death; and they sometimes extend to the vertex.

"The constitutional disturbance, that accompanies this disease, seems principally the effect of irritation. When the vesicles burst, the child begins to grow peevish and fretful, pale, loses its appetite, and the flesh becomes remarkably flabby. The periods of the disorder are not very regular; but it often happens, about the eighth day, that the pulse sinks, the lividity spreads over the whole sore, the fetor and discharge increase greatly. The smell is so strong as often to be perceivable at a distance from the bed. The discharge in one case, where the ulcers affected the arm pits and breasts, was such that the linen was completely loaded several times a day.

"Death takes place about the tenth or twelfth day, often preceded by convulsions, sometimes by extreme debility. Patients are apt to relapse soon after the sores are skinned over.

"The causes of this malady are rather obscure. It seems exclusively confined to children. Dr. M'Donnell saw twenty cases before the year 1795; all the patients were under four years old. Dr. Spear observed, that it was confined to children from the age of three months to that of five years; but it has been observed, near Dublin, in children of nine years old. It attacks the finest children in preference;* the children of the poor more frequently than those of the affluent; and those who live in damp situations seem more peculiarly subject to it than others. The disease is more prevalent in summer than in winter. It appears to be infectious, though obscurely so, in general; but, in the year 1800, Dr. Spear observed it to spread epidemically."

Diagnosis.—The eruption of pemphigus at the commencement bears some resemblance to that of varicella; but the progress of the vesicles, in the former case, to ulceration, and in the latter to desiccation, soon establishes the difference. Excoriations behind the ears, and in the angle between the thigh and pudenda, occasionally produce very troublesome sores; but they are to be distinguished from pemphigus by their origin, not in vesicles, but in simple chafing of the skin; neither are they so rapid in their course, nor attended with such severe constitutional disturbance.

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* This does not accord with our own experience, as we have usually seen the disease in ill-fed, delicate subjects.

The *Prognosis* in pemphigus gangrenosus is unfavorable, and the more so in proportion to the amount of constitutional disorder. The most unfavorable characters are, rapid spreading of the sores, and supervention of gangrene; also paleness and fetor of the discharge.

The *Treatment* of this disease has usually been directed principally to its local manifestations; and Dr. Stokes, with considerable trouble, procured and published the particulars of the composition of an ointment, which appears to have been extensively and successfully employed in its management by the Irish peasantry. The essential ingredient in this ointment, Dr. S. found to be the leaves of the *scrofularia nodosa (great figwort, phogram,* or *rose noble,)*—an officinal preparation of which has been latterly introduced into the Dublin Pharmacopœia. His practice was, in the first instance, to apply a carrot poultice, or one formed of porter and oatmeal, to the sores. After about eight hours, this was to be removed, the parts affected, very gently wiped with lint, and the scrofularia ointment, previously melted to the consistence of honey, applied by a soft feather, and with the utmost gentleness, to the whole surface of the sore. After smearing the ulcer with the ointment, it should be dressed with the same ointment, with the addition of one-eighth part of wax. The dressing should be repeated, in severe cases, every fourth or sixth hour. With respect to general treatment, Dr. S. says, "I believe it to be necessary that the child's bowels should be kept open. I also direct the internal use of yeast, which I am of opinion is of service, but cannot decidedly prove it to be so."

We entirely concur in the foregoing plan of *local* treatment, and have found considerable advantage in the employment of the scrofularia ointment; but our own experience would decidedly lead us to the adoption of a very careful *general* treatment. Change of locality, and free ventilation of the patient's apartment, should, if possible, be effected at the very commencement. The bowels should be regulated by alterative aperients, which commonly bring away dark-colored and offensive stools. The diet should be nutritious, but not stimulating; and if the child be suckling, a fresh and healthy nurse should be procured. As soon as the bowels have been set to rights, we commonly administer quinine; and if there be no diarrhœa, we may combine it with one of the mineral acids.

We have seen a comparatively chronic form of the disease among children, in which we have found the most decided benefit to attend upon the employment of iodine.

A disease has been described by Mr. Kinder Wood, in the 7th vol. of the Med. Chir. Transactions, under the name of "a very fatal affection of the pudendum of female children," which appears to us to be merely a form of pemphigus infantilis, and to require treatment founded on principles precisely similar to those we have just laid down. All Mr. Wood's cases occurred between the first and sixth years; and of twelve which he saw, only two recovered. One of the most remarkable symptoms which he observed, and which we may consider to be peculiar to the affection of the pudendum, was retention of urine. This appeared to be in a great measure voluntary, the patient being unwilling to encounter the pain of making an attempt at passing water: it accordingly required a vigilant attention on the part of the attendants. In a fatal case quoted by Mr. Wood, "the abdominal and thoracic viscera were found to have been free from disease."

CHAPTER XV.

DISEASES OF THE SKIN.

The cutaneous system, during the periods of infancy and childhood is subject, as in the adult, to many important forms of disease. Several of these we have already considered under other heads, and of those remaining unnoticed there are a considerable number which, presenting no remarkable peculiarities in the young subject, require no special attention in the present work. It would also be, manifestly, out of place to enter at any length into a consideration of the difficult and obscure subject of cutaneous diseases, or to attempt even a sketch of the manifold classifications invented by authors, with the design, hitherto unaccomplished, of introducing order and perspicuity into this intricate branch of medicine. We shall, therefore, content ourselves with a few short practical sketches of certain affections of the skin necessary to be understood by the child's physician, either from the frequency of their occurrence, or the peculiarities of their diagnosis or treatment during the early stages of life. Having laid down this limited plan for our guidance, we shall not adhere to any particular nosological system, but without mystifying ourselves and our readers by attempts to ascertain the various meanings attached to the same appellations by different authors, we will endeavor to attain intelligibility by the employment, as far as possible, of terms of a general signification and popular use.

I.—ERYTHEMA INTERTRIGO, (SCALDING OR CHAFING.)

This affection, which is a species of exanthem, very frequently occurs in infants and young children, showing itself on the groins, upper part of the thighs, scrotum, neck, between the buttocks, behind the ears, and on other parts where opposite surfaces of the skin are in continual contact, or subject to friction, being often occasioned, in the first instance, by neglect on the part of the nurse, and inattention to cleanliness.

It appears in the form of red blotches, irregular in shape, not definitely circumscribed, varying much in size, and commonly lasting from eight to twelve days. There is but little general fever; but the child is fretful, and the local inflammation is sometimes considerable, being accompanied by severe itching, and the exudation of a faint-smelling sero-purulent fluid. If the affection continues unrelieved, the skin becomes hard and chapped and troublesome excoriations follow. A form of erythema may sometimes be seen upon the cheeks of children during teething; at first appearing merely as a bright red blush, and subsequently leaving the skin rough and fretted.

The *diagnosis* of erythema intertrigo is not difficult. Erysipelas and syphilis are the diseases with which it is most likely to be confounded; but from the former it may be distinguished by its superficial character, and by the absence of any severe constitutional disturbance. Its common seat about the groins and buttocks may cause it to bear some slight resemblance to syphilis; but the coppery color of the latter, together with the snuffles and other symptoms belonging to it, furnish abundant means of discrimination.

The *treatment* of this affection is very simple, consisting almost entirely in a removal of the exciting cause by strict attention to cleanliness, and keeping the parts dry. When the inflammation is considerable, fomentations with warm water, or decoction of chamomile flowers, will be useful. When the discharge is troublesome the parts may be washed, two or three times daily, with tepid spirits and water, and subsequently dusted over with finely powdered starch. The administration of a mild alterative aperient, as the powder of rhubarb and magnesia (p. 161) will usually complete the cure.

II.—URTICARIA, (NETTLE-RASH.)

Young children are not unfrequently affected with this eruption, which, though unimportant in its own nature, may, by the suddenness of its attack, occasion considerable alarm. It is most likely to occur in hot weather, and often seizes children during sleep, from which they then awake restless and screaming. Upon examination, the body and lower limbs will be found covered with raised patches or wheals of an irregular shape and pale color, resembling those caused by the stinging of nettles, and accompanied with excessive itchiness. It may often be traced, as in adults, to some irregularity of diet.

Nettle-rash is an affection of very trifling importance, and in the child usually requires but little treatment. A tepid bath will relieve the itchiness and heat, and a slight aperient will commonly remove the exciting cause of the disease.

III.—SCABIES, (ITCH.)

This disgusting disease is very frequently met with in young infants, whose tender skins are extremely susceptible of the infection. Its nature is, however, often mistaken, and it is chiefly upon this account that we are led to notice it. Itch is commonly communicated to young infants from the hands or breast of the nurse, and it, therefore, first appears upon the buttocks and lower limbs, or upon the back of the neck, the hands often continuing completely free from spots. Owing to the delicacy of the skin it is attended with much more inflammation than in adults, and sooner assumes a pustular character. The pustules, also, break earlier, and thus give rise to larger and more doubtful looking ulcers and scabs. These circumstances, together with the severe constitutional disturbance which itch often occasions in the young child, frequently perplex and deceive the practitioner, and we have not unfrequently known it to be mistaken for a syphilitic eruption.

The *diagnosis* will commonly be made quite clear by an inspection of the nurse, on whose skin the true characters of the disease may, in almost every instance, be readily recognized.

The *treatment* may be disposed of in very few words; it consists, as in the adult, of the internal and external use of sulphur. With children, however, this powerful medicine must be cautiously used; not more than a drachm of the ointment should ever be applied at one time, and the application should be made successively to different parts of the body. The plan which we adopt is to direct a portion of sulphur ointment, about the bulk of a hazel nut, to be rubbed, at bedtime, upon a fourth part of the surface of the body, and the child to be placed in a tepid bath for ten minutes on the succeeding morning. The process is to be repeated, each night, upon a different portion of the body, until the eruption has entirely disappeared; at the same time to more grown children half a drachm of sulphur electuary should be given every second night; but for those at the breast it will be sufficient to give the nurse, each night, a teaspoonful of the flower of sulphur.

IV.—CRUSTA LACTEA.

The disease of which we propose to treat under this name has been variously denominated by system-mongers, according to their peculiar fancies in the matter of classification. Thus, it is termed, by Willan, Porrigo larvalis; by Bateman, Impetigo larvalis; by Rayer, Eczema impetiginodes; and by others, Tinea muciflua, granulata, &c. &c. but unfortunately by none of these learned appellations are we made at all the wiser as to the nature and treatment of the affection.

The eruption usually occurs during teething, and appears to be much connected with that process; it commonly commences on the forehead, by the breaking out of a number of small, yellowish pustules, more or less confluent and crowded together upon a red surface. These pustules excite great itchiness, and are quickly broken, discharging a viscid fluid that subsequently concretes into thin greenish-yellow scabs. The scabs are frequently rubbed off, and, when they form again, are tinged of a dark color by the blood which follows the furious scratching of the child. Fresh crops of pustules appear around the scabs which quickly extend to the scalp and over the face, sometimes covering the latter as with a mask, and justifying the epithet *larvalis*. When the scalp becomes engaged, the lymphatic glands at the back of the neck enlarge and occasionally suppurate. The ears seldom escape, and patches of the eruption will also often appear upon the neck and breast; upon the head, the discharge from the pustules is caught by the hair and concretes into small, irregular, friable masses, somewhat resembling the bruised yolk of a hard-boiled egg. At the termination of the disease, the skin of the face remains, for some time, red and tender, but scarcely ever retains any permanent marks. Owing to the extreme itchiness, and the irritation occasioned by the continual efforts of the child to scratch its face and head, sleep will usually be much disturbed, and a state of uneasiness and fretfulness kept up: it is, however, often wonderful how little the general health may be affected in this disease, and how well the process of dentition, and the functions of digestion and nutrition may be performed during its continuance. Still our observation does not lead us to coincide, unconditionally, with Dr. Underwood, who says, he "never saw an infant much loaded with it but it has always been healthy, and cut its teeth remarkably well." We have certainly seen it produce severe and dangerous constitutional disturbance, although such cases are exceptional, and the *prognosis* is, in general, highly favorable. This disease does not appear to be contagious, although Alibert mentions an instance in which it was propagated by inoculation.

The *treatment* of crusta lactea should, we think, be of a very simple kind. We have little faith in the numerous lotions recommended by authors, and ointments of all sorts we have invariably found to be injurious. In the early stages, when there is considerable inflammation, and the discharge is copious and acrid, bathing, several times during the day, with tepid water or a decoction of poppy heads, will give relief, and when the scabs are hard and extensive, poultices of linseed meal will be necessary for their removal. The hands of the child should be muffled at night, and it should be carefully watched in order to prevent it from scratching its face and head, but the utmost attention will usually be insufficient for this purpose. When the severity of the inflammation has subsided, and the disease ceased to spread, we have derived much advantage from lightly touching the raw surfaces, from which scabs have been rubbed, with a pencil of lunar caustic, or brushing them over with a camel's hair pencil moistened in a solution of that substance. This application removes the itching more effectually than any other of which we are aware, and thus often enables the child to enjoy a night's quiet rest. The internal treatment should be such as may be indicated by the state of the general health; the employment of mild alterative aperients combined with antacids (Nos. 27, 28, and 29) will usually be productive of much benefit. When the disease becomes chronic, tonics will probably be required, among which none is more suitable than the hydriodated solution of iodine (No. 10). In this stage we have also found the tepid, or, when the season is suitable, the cold salt water bath, very serviceable. In every case, the strictest attention should be given to the regulation of the diet, and the restriction of all articles of a stimulant or acescent character.

V.—HERPES CIRCINNATUS (RINGWORM.)

This affection is very common among children after the period of infancy. With some individuals it is an annual visitant, making its appearance, regularly, every spring, during the period of childhood. The vesicular ringworm is an eruption of small, globular vesicles crowded closely together, and arranged in the form of a ring or crescent; the portion of skin included within the figure, is healthy and of its natural appearance, and commonly measures from half an inch to two inches in diameter. The vesicles are filled with a transparent fluid, and the skin upon which they are set is of a red color, especially towards the outer margin of the circle. The breaking out of the eruption is attended with itching and smarting which continue during its progress. In five or six days, the redness begins to disappear, the vesicles become turbid and finally burst, their place being then occupied by thin scaly scabs, which desquamate, between the tenth and fifteenth days from the commencement, leaving the skin beneath, of a bright red color. Sometimes the smaller vesicles do not burst; but the fluid within them being absorbed, a slight desquamation of the cuticle takes place. Several patches of ringworm usually appear at the same time, or they may be evolved in succession during a period of several weeks; their most common sites are the forehead, backs of the hands and wrists, the ham, and the back part of the forearm near the elbow. Very little constitutional disturbance attends the eruption, which does not seem to be contagious, although it is often seen at the same time upon several individuals in a family or school. This, however, may be accounted for by the disposition of the disease to appear at a particular season of the year. The name of vesicular ringworm, must not lead to its being confounded with pustular ringworm of the scalp, (*porrigo scutulata*,) which is a disease of a very different character and much more troublesome nature. The *Herpes circinnatus* or vesicular ringworm, though troublesome from its appearance and itchiness, is seldom followed by any permanent, disagreeable results.

The *treatment* consists in little more than guarding the affected part from the ill effects of scratching. At the commencement, the best application will be a fold of lint wet with cold water, and covered with a piece of oiled silk—the common water dressing. Should this not relieve the itchiness, the spots may be brushed over with a solution of nitrate of silver. Alterative aperients should at the same time be given, and, during the process of desquamation, the tepid salt water bath should be frequently employed.

VI.—TINEA CAPITIS, (SCALD-HEAD.)

No words could convey a keener satire upon the imperfection of the medical art, than would a simple enumeration of the names and epithets invented by various authors for the disease of scald-head, and a contrast of that multitudinous catalogue, with the beggarly account of actual knowledge whereby we can reasonably expect to accomplish the removal of this distressing affection. Chapters and volumes have been composed upon this unhappy subject; the finest distinctions between the varieties of scabs and sores have been pointed out; the most learned and unintelligible names have been constructed from all languages; the art of the apothecary, and the fancy of the quack, have been strained for the invention of ointments, lotions, and depilatories, and yet, we believe, no systematic writer, at the present day, points to any line of treatment to which we can look with a confident hope of its being sufficient for the cure of any particular case of the disease. Still we do not believe tinea capitis to be hopelessly incurable; and we are further of opinion, that the obstinacy with which it has hitherto been found to resist treatment, has been referable less to its own nature than to the want of patience on the part of medical practitioners, and the variety of remedial experiments which they have consequently been led to institute. In the observations which we now propose to make, we shall not attempt to follow out the tedious descriptions of the systematic writers, or to remove the obscurity with which their whimsical epithets and divisions have enveloped the subject, but, without entering into nice distinctions, will endeavor to convey a general view of the characters of the disease, and thereupon to found rational principles of treatment.

Tinea Capitis is a disease rather of childhood than of infancy, commonly occurring about the sixth or seventh year. It may, however, make its appearance at a much earlier age. It is highly contagious, and is very readily communicated among children using the same combs or brushes, or wearing the same head dress, so that when once introduced into a school or other assemblage of young persons, it is very likely to contaminate almost every individual. Besides contagion, there would appear to be other causes that favor the production of tinea, and which are well worthy of attention. We find, for example, that it is comparatively uncommon in the boarding schools used by the children of the higher classes, while it is a very common visitant of institutions in which any considerable number of the children of the poor are assembled. When we inquire into the circumstances of these assemblages, we shall usually find that the children are the offspring of very destitute parents; that they have been neglected and ill fed during infancy, and are consequently defective in constitution, and often scrofulous. Their habits in such institutions, are also, very generally, unfavorable to health; they are kept during a great portion of the day in a sedentary posture, and in a crowded school-room; their sleeping apartments are over filled; their food ill suited to their tender years, and their clothing often insufficient upon some parts of the body, as the head or feet; cleanliness, too, is frequently but superficially practised among them. Such are the circumstances under which tinea most commonly appears, and we can scarcely refuse to admit that they must be considered as at least among the causes that favor its production.

The external characters of tinea vary considerably in different cases; such variation, apparently, depending partly upon the duration of the disease, and partly upon the constitution of the patient. Thus we shall have in one case, the scalp covered with clusters of minute, oozing, red prominences, some of which are covered with dry yellowish scabs, while others are indented with pits or cups filled with pus, presenting a honey-combed appearance and exhaling a disagreeable odor, similar to that of the urine of cats. These characters have been described by authors under various names, as *porrigo* or *tinea, favosa* or *lupinosa; favus dispersus; true porrigo.*

In another instance, the scabs will be found to be thick and firm, and to assume somewhat of a definite circular shape whence many other names are derived; as *porrigo scutulata; pustular ringworm, favus confertus.*

Again, when the scabs are united into one firm incrustation, covering the head like a cap, the names of *tinea crustacea, porrigo larvalis,* and *impetigo larvalis* have been applied to the disease; while it is by some termed *tinea granulata,* when the hairs are matted and glued together, by the scabs, into separate tufts.

In a fifth case we may have the discharge less abundant and less viscid, in consequence of which the scabs will assume a thin and scaly character; or the discharge may dry into a branny powder which can be easily separated from the scalp. In these cases which are most common among scrofulous children, the hair becomes weak and light colored, and falls off in patches. When it assumes this appearance, the disease has been called indifferently *tinea furfurans, tinea asbestina, porrigo furfuracea, ecpyesis porrigo.*

Lastly, as a consequence of tinea, the scalp may become, entirely or in part, devoid of hair, the skin being free from ulceration or scab, and smooth, shining and white. This baldness is described by some writers as occurring without any previous morbid appearance; but we do not believe this statement to be correct: in most of the cases which have fallen under our notice, the loss of hair was known to have been preceded by an eruption of pustules, though in some instances, these were so minute as to attract but little attention. It is this state which is described in books under the title of *alopecia; porrigo decalvans; trichosis area.*

Tinea is always attended with extreme and harassing itchiness, which is augmented by the numerous pediculi produced under and among the scabs. The severity of the local irritation is generally shown by the swelling and inflammation of the lymphatic glands, at the nape of the neck, which often suppurate. The cellular tissue beneath the scalp will also, in severe and neglected cases, become the seat of collections of matter, and the inflammation may extend to the periosteum, and even to the bones of the cranium. It is attempted to be argued by some writers, that the disease is merely local. This opinion we conceive to be altogether incorrect; at all events there can be no doubt that if it be not occasioned, it is constantly attended by very considerable constitutional disturbance. Rayer correctly observes that tinea is often complicated with chronic inflammation of the gastro-intestinal mucous membrane, and that, when it becomes inveterate, the intellectual faculties are frequently diminished in vigor, and a sort of premature old age appears to be induced. The nails of the feet and hands sometimes exhibit remarkable alterations, increasing in thickness, and becoming rough, and yellowish in color.

It may be collected from what we have already stated, that we consider the *prognosis* in tinea capitis to be unfavorable. It may, however, wear itself out after a continuance of months or even years, and it may terminate, by a destruction of the bulbs of the hair, in that state of baldness to which we have just adverted. Our prognosis should, nevertheless, refer to the tediousness and obstinacy, rather than to the incurability of the disease. Patience and cleanliness, with attention to the general health are, we believe, the grand remedial agents required, and by the employment of these, during six months, the late Dr. J. Crampton,* cured a total of twenty-eight cases which he treated, together, during that period.

The *treatment* of tinea, as it is laid down in the works of systematic writers is a mere jumble of empirical experiments: lotions, ointments, escharotics, and depilatories of all kinds, from the decoction of flaxseed to the pitch cap, inclusive, have been freely recommended and unsparingly used, and each and all have most impartially failed. To enter into any discussion with respect to the numberless proposals of remedies, or even to enumerate them, would lead us far beyond our limits, and that without conveying the least particle of useful information to our readers. Those who are curious on the subject, we must, therefore, refer to the express works on cutaneous diseases, and we will now content ourselves with sketching the plan of treatment which appears to us most rational, and which we have found to be comparatively, though (we must confess) not absolutely, successful. The treatment, then, must be both constitutional and local; the former being directed to the re-establishment of the general health, by whatever may appear in each case to be the most suitable means. In children who have been leading sedentary lives, who have been poorly and carelessly fed, and whose digestive systems have consequently become disordered, aperients are strongly indicated, and those of a saline kind will be found to be particularly useful. In scrofulous children, much benefit will generally be derived from the use of the warm tonic purgatives, as the saline infusion of rhubard, (No. 28,) or the aloetic mixture, (No. 35.) Dr. Crampton recommends purgatives every second morning; but we must, of course, use our discretion as to the frequency of their repetition, always stopping short of exciting any excessive irritation in the intestinal canal. In almost every case, we shall find advantage from the employment of iodine, given in the form of the hydriodated solution, (No. 10,) and in doses suited to the age of the child. Should the hepatic system be materially deranged, alterative doses of mercury may be usefully given in conjunction with the purgatives. In patients whose general health is affected as we have described that of sufferers from tinea usually to be, the skin will almost always be in an unhealthy state, being dry, harsh, and supplied irregularly with heat. In such cases, no remedial measure is more useful than the warm bath, which may be employed every second or third night. While adopting these means, in whole or in part, as may in each case seem advisable, the strictest attention must be paid to the regulation of the diet, which should be light, nutritious, and such as we may find from experience will agree best with each patient. The clothing also should be comfortable, the feet kept warm and dry, and precautions adopted for preventing an irregular distribution of heat throughout the body. The sleeping apartment of the child should be airy, and not overcrowded with occupants.

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* We have to acknowledge the great advantages which we derived from a perusal of the paper of this able and lamented physician, published in the fourth vol. of the transactions of the King and Queen's College of Physicians. In a few pages, Dr. Crampton has conveyed more information in an intelligible form, than is to be found in all the systematic works taken together.

In conducting the local treatment, the first indication is the removal of the scales and crusts, the presence of which upon the scalp keeps it in an irritated and filthy condition. The next step must have for its object to soothe and mitigate the inflammation under which the diseased parts more or less suffer. In pursuance of these indications, then, we must at once have the hair taken off by clipping, or shaving when that is practicable. The scabs or crusts must next be removed by washing with soap and water; or where that will not succeed, by poultices of oat or linseed meal. In some cases the crusts are unusually firm and tenacious, and in order to effect their removal we may find it necessary to employ, for a few days, poultices made of brown soap, reduced to a stiff jelly. When the scabs have been removed by this application, the linseed or oatmeal poultice may be resumed, and continued as long as the scalp remains in a morbid condition. As the poultice cannot be conveniently used while the patient is taking exercise, the best substitute for it, during such periods, will be the liniment of lime-water and oil, which may be smeared over the head with a brush or feather, and covered with a soft linen cloth. Throughout the treatment we need scarcely say that the head must be regularly washed with warm soap and water, and the utmost attention given to the preservation of cleanliness.

If the foregoing plan be pursued steadily and with patience, and recurred to, should relapses (as often happens) take place, it will, in many cases, according to our experience, prove successful. Should it fail, after a reasonable trial, the practitioner will probably be justified in resorting to the depilatories, escharotics, and other severe measures, recommended in books, and during their use the disease will no doubt sometimes be removed; we may state, however, that Dr. Crampton's twenty-eight cases were treated upon a plan similar to that laid down above, during six months, and were all ultimately cured. The topical applications tried by Dr. C. at first, all failed; among them were ointments of oxides of mercury, lead, and zinc; of pitch, sulphur, black pepper, and sulphuric acid; and lotions of almost all the metallic salts. We have ourselves tried most of these applications, and some others besides, and have not been much more successful in their use than was Dr. Crampton.

In that variety or termination of tinea capitis, in which the hair falls off in patches, leaving the scalp smooth and white, and known among authors as alopecia or porrigo decalvans, it becomes a desideratum to discover some means of promoting a new growth of hair. For this purpose a vast variety of applications have been recommended and tried; but we must frankly admit that we know of none possessing the least claims upon our confidence as cures for baldness.

THE END.

INDEX.

Abscesses, 190
Accidents at Birth, 167
Advice to Non-Medical Readers, 13
Air, 75
Alkalies, 121
Aloes, 165
Alopecia, 424
Angina, 217, 297, 304, 349
Antacids, 121
Antiphlogistics, 132
Anthelmintics, 166, 280
Ani Prolapsus, 247
Antimony Tartarized, 143, 146
Anus Imperforate, 172
Aphthæ, 212
Arachnitis, 332
Artificial Feeding, 56
Ascarides, 278
Asphyxia, 168
Asthma Thymicum, 308
Atelectasis Pulmonum, 172
Atrophia Ablactatorum, 232

Bark, 126
Baths, 152
——— Ioduretted, 401
Bed, 69
Biscuits, Purgative, 163
Blisters, 137
Blood-letting, 133
Blue Disease, 185
Boiling Water, Swallowing of, 304
Bottle, Sucking, 58
Bow's Opiate Liniment, 120
Bowels, Healthy state of, 73
——— Training of, 63
——— Affections of, 228
Brain, 32, 39
——— Irritation of, 319
——— Congestion of, 320
——— Effusion in, 321
——— Inflammations of, 326
Bread, Ferruginous, 402
Breasts, Swelling of, 197
Bronchitis, 292
Broncho-pneumonia, 292
——— cephalite, 315
Bronchotomy, 292, 304, 308, 312
Bryce's Test, 373
Burnt Holes, 413

Calomel, 115
Cancrum Oris, 226
Carminatives, 122
——— Dalby's, 123
Castor Oil, 156
Catarrh, 290
——— Bronchial, 292
Causes of Disease, 85
Cerebro-spinal System, 32
——— Diseases of, 319
Chalybeate Powder, 127
Change of Air, 110
Childhood, 25
Children, Management of, 46
——— Food of, 59
——— Still-born, 168
Chicken Pox, 366
Choice of a Nurse, 55
Cholera Infantum, 238
Circulatory System, 31
Cleanliness, 62
Climate, 111
Clothing, 64
Clyster, 166
Club Feet, 177
Cold, 64
Colic, 247
Colitis, 256
Colostrum, 50
Constitutional Diseases, 392
Convulsions, 323
Coryza, 290
Costiveness, 73
Cow Pox, 368
Cowhage, 280
Coxe's Hive-Syrup, 148
Cradles, 67
Croup, 297
——— Membrane of, 299
——— Spasmodic, 300
——— Cerebral, 308
Crowing Inspiration, 309
Crusta Lactea, 419
Cupping, 135
Cutaneous Diseases, 416
Cyanosis, 185
Cynanche Parotidea, 227
——— Trachealis, 297
——— Maligna, 349

Dalby's Carminative, 123
Dancing, 70
Deformities, 172
Dentition, 198
——— Treatment of, 204

Diagnosis, 99
Diaphoretics, 149
Diarrhœa, 242
Digestive Organs, 27
—————— Diseases of, 209
——————— Functional, 230
——————— Inflammatory, 254
Disease, 85
——— Signs of, 99
——— Foreshowing of the Event of, 105
——— at Birth, 167
——— Constitutional, 392
Diphtherite, 217
Dolichos, 280
Doses of Medicines, 108
Dressing of Infants, 48
Dysentery, 256

Ear, Scrofulous Disease of, 396
Early Rising, 68
Eczema, 419
Education, Physical, 46
——— Mental, 76
——— Moral, 80
——— Religious, 84
Emetics, 141
Enema, 166
Enteritis, 255
Eruptive Fevers, 340
Erysipelas, 188
Erythema, 417
Etiology, 85
Exanthemata, 340
Excitants, 125
Exercise, 69
Expectorants, 144

Favus, 423
Feeding, Artificial, 56
Feet, Swelling of, 203
—— Deformed, 177
Fever, 282, 340
Fingers, Supernumerary, 178
Fits, 186, 308, 323
Foreign bodies in Larynx, 306
Food, 50, 51, 56, 59
—— of Nurses, 54
Fractures, 184
Frenum Linguæ, Short, 176
Funis, 48, 63

Gardens, Public, 71
Gastritis, 255
Gastro-malacia, 241
Glottis, Ulceration of, 306
——— Spasm of, 308
Gripes, Watery, 245
Growth. 37
Gums, Lancing of, 206
Gum, Yellow, 192
—— Red, 197
Gymnastics, 70

Hands, Swelling of, 203
Hare-Lip, 176
Hardening of Cellular Tissue, 190
——— System, 65
Health, 99
Heat, 75
Heat of Infants, 47
Herniæ, 181
Herpes, 420
Hide-bound, 190
Hippo, 142
Hooping Cough, 312
Hoisting, 69
Huile Purgative, 165
Hydrargyrum, 114
Hydrencephaloid Disease, 322
Hydrocephalus, 327
————— Chronic, 332
————— Congenital, 332
Hydrocele, 183
Hypospadias, 174

Icterus, 192
Ileitis, 256
Impetigo, 419, 423
Induration, 190
Infant, 25
——— External Characteristics of, 26
——— Digestive Organs of, 27
——— Respiratory do., 30
——— Circulatory do., 31
——— Cerebro-spinal System of, 32
——— Senses of, 34
——— Locomotive Organs of, 36
——— Growth of, 37
——— Management of, 46
——— Heat of, 47
——— Washing of, 48
——— Dressing of, 48
——— Feeding of, 50, 51, 56
——— Weaning of, 58
——— Schools, 85
——— Indigestion of, 231
——— Cholera of, 238
Infantile Erysipelas, 188
———— Therapeutics, 108
———— Colic, 247
Infusion of Rhubarb, 161
Inflation of Lungs, 170
Inguinal Hernia, 183
Injuries during Birth, 184
Intellect, Development of, 42
Intertrigo, 417
Inoculation, 365, 375
Inward Fits, 308, 323
Iodine, 126, 129
Ipecacuan, 142
Iron, 126
Itch, 418

Jacob, Dr., Letter from, on Purulent Ophthalmia, 195
Jalap, 163
Jaundice, 192

Larynx, Foreign Bodies in, 306
——— Inflammations of, 304

Laryngismus, 308
Leeches, 134
Lientery, 246
Light, 74
Locomotive Organs, 36
Lockjaw, 186
Lumbricoides, 278
Lungs, Inflation of, 170

Management of Children, 46
Magnesia, 158
Manna, 157
Maternal Nursing, 51
Maw Worm, 279
Measles, 340
Meconium, 50
Medicine, 50, 72
Mercury, 114
Mesenteric Disease, 265
Mental Education, 76
Milk, Substitutes for, 57
Millet, 216
Mixture, Anti-Emetic, 123
——— Carminative, 123
——— Exciting, 125
——— Terebinthinate, 125
——— Strengthening, 126
——— Emetic, 142, 143
——— Expectorant, 144
————— Antimoniated, 143
——— Sedative Ipecacuan, 145
——— Sedative Squill, 146
——— Polygala, 147, 148
——— Aloetic, 165
——— Senna, 163
——— Manna, 157
——— Astringent, 235
Moles, 179
Moral Education, 80
Mortality of Infancy, 167
Mouth, Inflammation of, 211
——— Ulceration of, 211
——— Gangrene of, 224
Muguet, 216
Mumps, 227
Music, 83

Navel-string, 48, 63
Nævi, 179
Nervous System, 32
Nettle-rash, 418
Nine-day Fits, 186
Nursing, Maternal, 51
——— Obstacles to, 52
——— Rules for, 52
Nurses, Management of, 54
——— Choice of, 55
Nursery, 68, 75
——— Medicines, 73

Obstacles to Nursing, 52
Ointment, Sedative, 139
Omphalocele, 181
Opium, 118
Opiate Liniment, 120
Ophthalmia, 193
——— Scrofulous, 395

Paralysis, 185
Pastilles de Manne, 157
Peculiarities of Infants, 25, 85
Penis Imperforate, 173
Perforation of Bowels, 264
Peripneumonia, 292
Pericarditis, 297
Pemphigus, 413
Pertussis, 312
Pes Equinus, 177
Pleuritis, 297
Pneumonia, 295
Polygala, 147
Porrigo, 419, 423
Potion Calmante, 150
Powder, Chalybeate, 127
——— Expectorant, 144
——— Rhubarb and Magnesia, 161
——— Compound Rhubarb, 162
——— Jalap and Ipecacuan, 164
——— Sedative Ipecacuan, 145
——— Scammony and Chalk, 164
——— Scammony and Rhubarb, 165
Prescribing, 108
Prognosis, 105
Prolapsus Ani, 247
Public Gardens, 71
Pulse, 32
Purging, 72
Purgatives, 73, 155
——— Biscuits, 163
Purpura, 411
Pustule, Malignant, 225

Red Gum, 197
Refrigerants, 149
Remittent Fever, 282
Respiratory Organs, 30
————— Diseases of, 290
Retention of Urine, 174
Rhubarb, 160
Rickets, 404
Ringworm, 420, 423
Rocking, 68
Roseola, 345
Rules for Nursing, 52
——— Prescribing, 108
Rubeola, 340
——— Sine Catarrho, 345
——— Nigra, 346
Ruptures, 181

Salivation, 114
Salt, Use of, 406
Salts, Neutral, 158
Schools, Infant, 85
Scabies, 418
Scalding, 417
Scald Head, 421
Scarlatina, 346
——— Anginosa, 347
——— Maligna, 349

Scarlatina Faucium, 350
———— Treatment of, 352
Scammony, 164
Scrofula, 392
Scrofularia Nodosa, 415
Scrofulous Glands, 394
———— Ophthalmia, 395
———— Ulcers, 396
———— Ear, 396
———— Discharge from Vagina, 396
Senses, 34
Sedatives, 117
Senna, 162
Sinapisms, 140
Skin, Diseases of, 416
Skin-bound, 190
Sleep, 66
Small Pox, 358
———— Confluent, 360
———— Modified, 361
Snuffles, 408
Solutio Iodinii, 130
Somnolency, 320
Spasm of Glottis, 308
Spina Bifida, 174
Spoon-feeding, 56
Squill, 143, 146
Steel, 126
Still-born Children, 168
Stimulants, 124
Strengthening Mixtures, 126
Stomach, Affections of, 228
———— Softening of, 239
Stomatitis, 211
Strophulus, 197
Strumous Dyspepsia, 393
Sucking Bottle, 58
Suppositorium Anthelminticum, 166
Suppression of Urine, 174
Sudden Death, 311
Swelling of Breasts, 197
———— Hands and Feet, 203
Swine Pox, 366
Syphilis, 407
Syrup, Simple Sedative, 119
——— Compound Sedative, 119

Tabes Mesenterica, 265
Tape Worm, 279
Tartar Emetic, 142, 145
Teething, 198
Teeth Permanent, 207
Temperament, 44
Therapeutics, 108
Throat, Scarlatina of, 350
Thrush, 211, 217
Thread Worm, 278
Thymic Asthma, 308
Thymus Gland, Enlargement of, 312
Tinea Capitis, 421
Toes, Supernumerary, 178
Tonics, 125
Tongue-tied, 176
Tricocephalus, 278
Trismus, 186
Tubercle, 399
Tuberculous Fever, 393
Tumors on Head, 184
Turpentine, 125

Umbilical Cord, 48
———— Hernia, 181
Unguentum Sedativum, 139
———— Anthelminticum, 166
Urine, Retention of, 174
——— Suppression of, 174
Urticaria, 418

Vaccination, 368
———— Spurious, 378
Vaccine Controversy, 380
Vagina, Imperforate, 173
——— Discharge from, 396
Valgus, 177
Varus, 177
Varicella, 368
Variola, 358
Ventilation, 68, 75
Vernix Caseosa, 47

Wakefulness, 319
Washing, 48, 62
Water, 150
——— Boiling, Swallowing of, 304
Watery Gripes, 245
Weaning, 58
——— Brash, 232
Worms, 275

Yellow Gum, 192

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